Loop-W8140
Outdoor 2.4G/5.8G Wireless Bridge
USER'S MANUAL

LOOP TELECOMMUNICATION INTERNATIONAL, INC.
8F, NO. 8, HSIN ANN RD.
SCIENCE-BASED INDUSTRIAL PARK
HSINCHU, TAIWAN
Tel: +886-3-578-7696
Fax: +886-3-578-7695

IMPORTANT NOTE

The transmitter module may not be co-located with any other transmitter or antenna.
The next nearest transmitter or antenna must be at least 30 meters away.

© 2011 Loop Telecommunication International, Inc. All rights reserved.
Version 2 22 MAR 2011

Table of Contents

1 PRODUCT DESCRIPTION 3
1.1 Description 3
1.2 Features 3
1.3 GENERAL PRODUCT SPECIFICATIONS 4
2 PACKAGE CONTENTS 8
2.1 Component List 8
2.2 Connections 9
2.3 Outdoor Enclosure Installation Guide 11
2.4 Earthing Guideline 12
3 QUICK SETUP GUIDE 17
3.1 System Requirements for Configuration 17
3.2 Setup Guide 17
3.3 LEDs 18
3.4 Factory Default 19
4 BASIC IP NETWORKING 20
5 GETTING STARTED 22
6 CONFIGURATION MENU 23
6.1 Network 25
6.1.1 IP Settings 25
6.1.2 SNMP Configuration 28
6.1.3 Protocol Filter Setting 29
6.1.4 QoS 30
6.2 Wireless 31
6.2.1 Basic Settings 31
6.2.2 Advanced Settings 37
6.2.3 Security Setting 38
6.2.4 Site Survey 43
6.2.5 MAC Access Control 44
6.3 Management 45
6.3.1 Status 45
6.3.2 Statistics 46
6.3.3 Miscellaneous 47
6.3.4 Performance 48
6.3.5 Alarm Settings 49
6.3.6 Time Settings 50
6.3.7 Password Setup 50
6.3.8 System Log 51
6.3.9 Firmware Upgrade (for User ADMIN only) 52
7 Troubleshooting 53
8 GLOSSARY 54
9 DISCLAIMER 55

List of Figures

Figure 1-1 W8140 3
Figure 2-1 Components 8
Figure 2-2 PoE (Power over Ethernet) Power Supply 9
Figure 2-3 Pin Identification 9
Figure 2-4 Network Connection 9
Figure 2-5 Antenna Alignment 10
Figure 3-1 LEDs 18

List of Tables

Table 2-1 PoE (Power over Ethernet) Power Supply Device Pinout 9
Table 3-1 LEDs Status 18
Table 6-1 User name and Password 23
Table 6-2 Signal Strength 43

1 PRODUCT DESCRIPTION

1.1 Description

The Loop-W8140 is an Outdoor WLAN for WLL (wireless local loop) which is a cost effective solution addressing triple play services (voice, video and data) for home and enterprise access point, and gateway applications. It is suited for point to point and point to multi-point applications.

The W8140 comes in an industrial grade (IP67), rugged, cast plastic casing and is designed with mobility in mind. It can also be used in moving vehicles where reliable, long haul wireless communication is critical.

Figure 1-1 W8140

1.2 Features

General

- Industrial grade IP67 rugged, cast plastic casing
- 2.4G/5.8G Dual mode AP
- Mode selectable: AP, Client, Bridge: Master Bridge, Slave Bridge, Repeater
- Bandwidth control with QoS, and video, voice and data scheduling
- Wireless Distribution System (WDS)
- VLAN tag
- QoS Support
- Protocol filtering for Internet and Intranet networks
- Up to 250 associations and 50 concurrent users
- Wireless isolation between wireless clients
- Web and SNMP management
- Support up to 4 E1 transmission

Standards

- Wireless: IEEE802.11a/b/g/n
- Ethernet: IEEE802.3, 802.3u (CSMA/CD)
- RoHS compliant

IEEE802.11a/b/g/n

- IEEE 802.11a/b/g compliant up to 54 Mbps
- 100/500 mW output power transmission
- Channel bandwidth adjustable 5/10 MHz for a/b/g only
- Up to 108 Mbps data rate in Turbo Mode
- Up to 25 Km range with external antenna LOS (Line of Sight)

1.3 GENERAL PRODUCT SPECIFICATIONS

Ethernet Functions

Ethernet Port	10/100 Base-T (RJ-45 connector) with auto MDIX

Management Functions

Web-based management	
System Load Default	
System status report	
Association Client List	
SNMP	V1 and V2c
Auto Associate to IP with same ESSID	
DHCP Client, Auto Negotiate for IP	
IP address discovery software (Viper Quick Start)	Future option
Firmware can be upgraded through web-server and Telnet	
Number of client associations	AP mode: 250
Number of concurrent users	AP mode: 50 Repeater mode: 30
Number of Wireless uplinks	Repeater mode: 1
Password Access control to configuration	2 Levels
Ping from Device	Through Telnet

Security and Access Control

Static WEP	Max 152 bits
MAC Access Control List	
Remote AP MAC Control	
WPA, 802.1x Support	In AP mode only
WPA-PSK	PassPhase with TKIP and AES ciphers EAP-TLs, EAP-TTLS, EAP-GTC in access point mode
Configuration file download (Telnet)	
Save last good Setting	
Software Reset	
Software Factory Reset	
Multiple FTP Pass Through	
VLAN Tag	*Note: When this feature is enabled, the data bandwidth is set, and the balance of bandwidth will be used for live data such as video and VoIP packets.
Bandwidth Limiting with QoS* (priority for UDP over TCP data)	
802.11e QoS (priority for Voice and Multimedia)	For AP Mode
Wireless Client to Client Isolation	
Suppress SSID	Enable, Disable, Disable with multiple clients behind CPE
WDS (Wireless Distribution System)	

Electrical

Power adapter	18~48V DC through RJ45
Power consumption	Typical 8.5 Watts (Maximum 9 Watts)

Physical and Environmental

Dimensions	121.3 mm x 214.2 mm x 46mm (WxHxD)
Weight	1.2Kg, module only
Power Requirement	Maximum 11 Watts
Antenna Connectors	Two (2) 50 ohm, N-type (female)
Power Over Ethernet (PoE)	Passive PoE, non-3af compliant
Operating Temperature	-20°C to +60°C
Relative Humidity when operational	20% to 90% (non-condensing)
Relative Humidity during storage	Max. 95% (non-condensing)
Wind Speed Support	160 Km/hr.

Standards and Compliances

IEEE Wireless Standard	802.11a/b/g/n
IEEE Ethernet Standard	802.3, 802.3u (CSMA/CD)
Waterproof Rating	IP67
Random Vibration	IEC-68-2-64
Shock	IEC-68-2-29
Drop	IEC-68-2-32
Salt Fog	IEC-68-2-11
Solar Radiation	IEC-68-2-5
Safety	EN 60950
EMC and RFI	FCC Part 15 C
ESD	IEC 61000-4-2
Lightning Protection at Ethernet Port	
Certification	FCC

*Future option

Loop-W8140-a/b/g-500mW PRODUCT SPECIFICATIONS

RF (Radio Frequency) Specifications

Frequency	2.4 GHz: 2412 to 2484 MHz or 5.8 GHz: 4900 to 5825 MHz (software configurable)
Maximum Data Rate with Auto Fall Back	108 Mbps
Wireless Data Rate	54, 48, 36, 24, 12, 11, 9, 6, 5.5, 2, 1 Mbps, 108 Mbps for Turbo mode
Channels	12 channels (USA/Canada), 13 channels (Singapore, Europe except France),14 channels (Japan)
Channel Frequency Step Size	5 MHz
Best Channel Scanning at Power up	AP Mode only
Radio Channel Select	Determined by AP
Radio Power Control (3dB steps)	5 level from Max
Transmitter Output Power	Up to 27 dBm
Modes Supported	AP, Repeater, Bridge, Client
Nominal Antenna Port Impedance	50 ohms x 2 (for external antenna connector, if applicable)
Media Access Protocol	CSMA/CA with ACK (Carrier Sense Multi-point Access/Collision detection with acknowledgement)
Modulation Technique	DSS, DBPSK, DQPSK, CCK, OFDMBPSK, QPSK, 16QAM, 64QAM
Max distance (With suitable antenna)	Up to 25 Km, point to point
Antenna Type	1 ports for receive diversity, Tx/Rx & Rx

OPERATING FREQUENCY 2412MHz-2462MHz (2.4 GHz)							
TX POWER SPECIFICATIONS					RX SPECIFICATIONS		
	Data Rate	Avg. TX	Tolerance		Data Rate	Sensitivity	Tolerance
11b/g	1-24Mbps	27 dBm	+/-2dB	11b/g	1-24Mbps	-90 dBm	+/-3dB
	36Mbps	24 dBm	+/-2dB		36Mbps	-76 dBm	+/-3dB
	48Mbps	23 dBm	+/-2dB		48Mbps	-73 dBm	+/-3dB
	54Mbps	22 dBm	+/-2dB		54Mbps	-70 dBm	+/-3dB
OPERATING FREQUENCY 5475MHz-5825MHz (5 GHz)							
TX POWER SPECIFICATIONS					RX SPECIFICATIONS		
11a	Data Rate	Avg. TX	Tolerance	11a	Data Rate	Sensitivity	Tolerance
	1-24Mbps	22 dBm	+/-2dB		1-24Mbps	-90 dBm	+/-3dB
	36Mbps	20 dBm	+/-2dB		36Mbps	-76 dBm	+/-3dB
	48Mbps	19 dBm	+/-2dB		48Mbps	-73 dBm	+/-3dB
	54Mbps	18 dBm	+/-2dB		54Mbps	-70 dBm	+/-3dB

*Loop-W8140-MIMO-a/b/g/n-250mW PRODUCT SPECIFICATIONS**

Frequency	2.4 GHz: 2412 to 2484 MHz or 5GHz: 4900 to 5825 MHz (software configurable)
Wireless Data Rate	Up to 300 Mbps
Channels country code setting	802.11bg: • FCC • Japan • Europe • China 802.11a: • FCC49 • CE • China
Best Channel Scanning at Power up	AP Mode only
Radio Channel Select	Determine by AP
Radio Power Control (3dB steps)	5 level from Max
Transmitter Output Power	Up to 24 dBm
Modes Supported	AP, Repeater, Bridge, Client
Nominal Antenna Port Impedance	50 ohms x 2 (for external antenna connector, if applicable)
Media Access Protocol	CSMA/CA with ACK (Carrier Sense Multi-point Access/Collision detection with acknowledgement)
Modulation Technique	DSS, DBPSK, DQPSK, CCK, OFDMBPSK, QPSK, 16QAM, 64QAM
Max distance (With suitable antenna)	Up to 25 Km, point to point
Antenna Type	2 ports for receive diversity, Tx/Rx & Rx

OPERATING FREQUENCY 2412MHz-2462MHz							
2.4GHz TX POWER SPECIFICATIONS					2.4GHz RX SPECIFICATIONS		
	Data Rate	Avg. TX	Tolerance		Data Rate	Sensitivity	Tolerance
11b/g	1-24Mbps	24 dBm	+/-2dB	11b/g	1-24Mbps	-97 dBm	+/-3dB
	36Mbps	22 dBm	+/-2dB		36Mbps	-90 dBm	+/-3dB
	48Mbps	20 dBm	+/-2dB		48Mbps	-86 dBm	+/-3dB
	54Mbps	19 dBm	+/-2dB		54Mbps	-84 dBm	+/-3dB
11n	20M MCS0@ 6Mbps	24dBm	+/-2dB	11n	MCS0	-97 dBm	+/-3dB
	20M MCS1@9Mbps	24dBm	+/-2dB		MCS1	-96 dBm	+/-3dB
	20M MCS2@ 12Mbps	24dBm	+/-2dB		MCS2	-93 dBm	+/-3dB
	20M MCS3@ 18Mbps	22dBm	+/-2dB		MCS3	-91 dBm	+/-3dB
	20M MCS4@ 24Mbps	22dBm	+/-2dB		MCS4	-87 dBm	+/-3dB
	20M MCS5@ 36Mbps	22dBm	+/-2dB		MCS5	-84 dBm	+/-3dB
	20M MCS6@48Mbps	18dBm	+/-2dB		MCS6	-78 dBm	+/-3dB
	20M MCS7@54 Mbps	15dBm	+/-2dB		MCS7	-75 dBm	+/-3dB
	40M MCS8@ 6Mbps	24dBm	+/-2dB		MCS8	-96 dBm	+/-3dB
	40M MCS9@9Mbps	24dBm	+/-2dB		MCS9	-94 dBm	+/-3dB
	40MMCS10@ 12Mbps	22dBm	+/-2dB		MCS10	-91 dBm	+/-3dB
	40M MCS11@ 18Mbps	20dBm	+/-2dB		MCS11	-88 dBm	+/-3dB
	40M MCS12@ 24Mbps	20dBm	+/-2dB		MCS12	-85 dBm	+/-3dB
	40M MCS13@ 36Mbps	17dBm	+/-2dB		MCS13	-80 dBm	+/-3dB
	40M MCS14@48Mbps	17dBm	+/-2dB		MCS14	-79 dBm	+/-3dB
	40M MCS15@54 Mbps	15dBm	+/-2dB		MCS15	-76 dBm	+/-3dB

OPERATING FREQUENCY 5475MHz-5825MHz							
5GHz TX POWER SPECIFICATIONS					5GHz RX SPECIFICATIONS			
	Data Rate	Avg. TX	Tolerance			Data Rate	Sensitivity	Tolerance
11a	1-24Mbps	24 dBm	+/-2dB		11a	1-24Mbps	-96 dBm	+/-3dB
	36Mbps	22 dBm	+/-2dB			36Mbps	-95 dBm	+/-3dB
	48Mbps	20 dBm	+/-2dB			48Mbps	-94 dBm	+/-3dB
	54Mbps	19 dBm	+/-2dB			54Mbps	-91 dBm	+/-3dB
11n	20M MCS0@ 6Mbps	24dBm	+/-2dB		11n	MCS0	-97 dBm	+/-3dB
	20M MCS1@9Mbps	24dBm	+/-2dB			MCS1	-96 dBm	+/-3dB
	20M MCS2@ 12Mbps	24dBm	+/-2dB			MCS2	-93 dBm	+/-3dB
	20M MCS3@ 18Mbps	22dBm	+/-2dB			MCS3	-91 dBm	+/-3dB
	20M MCS4@ 24Mbps	22dBm	+/-2dB			MCS4	-87 dBm	+/-3dB
	20M MCS5@ 36Mbps	22dBm	+/-2dB			MCS5	-84 dBm	+/-3dB
	20M MCS6@48Mbps	18dBm	+/-2dB			MCS6	-78 dBm	+/-3dB
	20M MCS7@54 Mbps	15dBm	+/-2dB			MCS7	-75 dBm	+/-3dB
	40M MCS8@ 6Mbps	24dBm	+/-2dB			MCS8	-96 dBm	+/-3dB
	40M MCS9@9Mbps	24dBm	+/-2dB			MCS9	-94 dBm	+/-3dB
	40MMCS10@ 12Mbps	22dBm	+/-2dB			MCS10	-91 dBm	+/-3dB
	40M MCS11@ 18Mbps	20dBm	+/-2dB			MCS11	-88 dBm	+/-3dB
	40M MCS12@ 24Mbps	20dBm	+/-2dB			MCS12	-85 dBm	+/-3dB
	40M MCS13@ 36Mbps	17dBm	+/-2dB			MCS13	-80 dBm	+/-3dB
	40M MCS14@48Mbps	17dBm	+/-2dB			MCS14	-79 dBm	+/-3dB
	40M MCS15@54 Mbps	15dBm	+/-2dB			MCS15	-76 dBm	+/-3dB

2 PACKAGE CONTENTS

2.1 Component List

1. Loop-W8140
2. mounting bracket (pole)
3. screws
4. clamps
5. washers, nuts, U-bolt
6. waterproof RJ 45 adaptor

Figure 2-1 Components

Note: Standard package may vary with model type and country. Using a combiner adaptor with a power rating other than the one included in the package will cause serious damage to the Access Point and void the warranty for this product.

2.2 Connections

PoE (Power over Ethernet) Connection

An extremely compact device, the Power Over Ethernet (PoE) provides Ethernet only services through one Ethernet port. The PoE power supply device is shown in the figure below.

Figure 2-2 PoE (Power over Ethernet) Power Supply

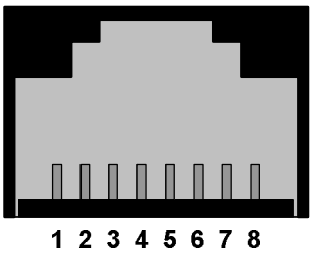


Figure 2-3 Pin Identification

Pinout values for the PoE power supply are listed in the table below. They are also printed on the back of the PoE unit.

Pin ID	LAN + DC Pinout	LAN Pinout
1	Ethernet	Ethernet
2	Ethernet	Ethernet
3	Ethernet	Ethernet
4	Power+	
5	Power+	
6	Ethernet	Ethernet
7	Power-	
8	Power-	

Table 2-1 PoE (Power over Ethernet) Power Supply Device Pinout

Network Connection

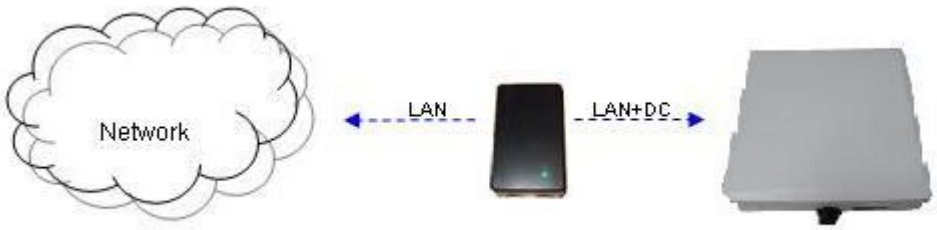


Figure 2-4 Network Connection

Installing the access point to your Network

Please follow the following instruction to build the network connection between your new wireless access point and your computers, network devices:

1. Connect the access point to ADSL modem, router, or switch/hub in your network through the DATA IN port of the access point by Ethernet cable.

2. Connect the power adapter to the wall socket, and then connect it to the 'Power' socket of the PoE.

3. Connect the access point and the PoE through P+DATA OUT port.

3. Please check the LEDs of W8140. 'PWR' LED should be steadily on, LAN LED should be on if the access point is correctly connected to the ADSL modem, router or switch/hub.

Antenna Alignment

Some models of the Loop-W8140 have a built-in antenna. Others use exterior antennas. Regardless of antenna type, there must be line of sight alignment between the antennas.

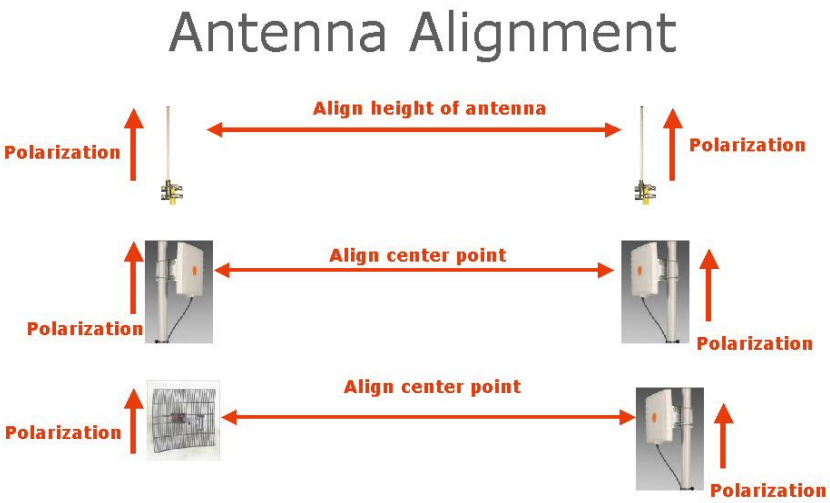


Figure 2-5 Antenna Alignment

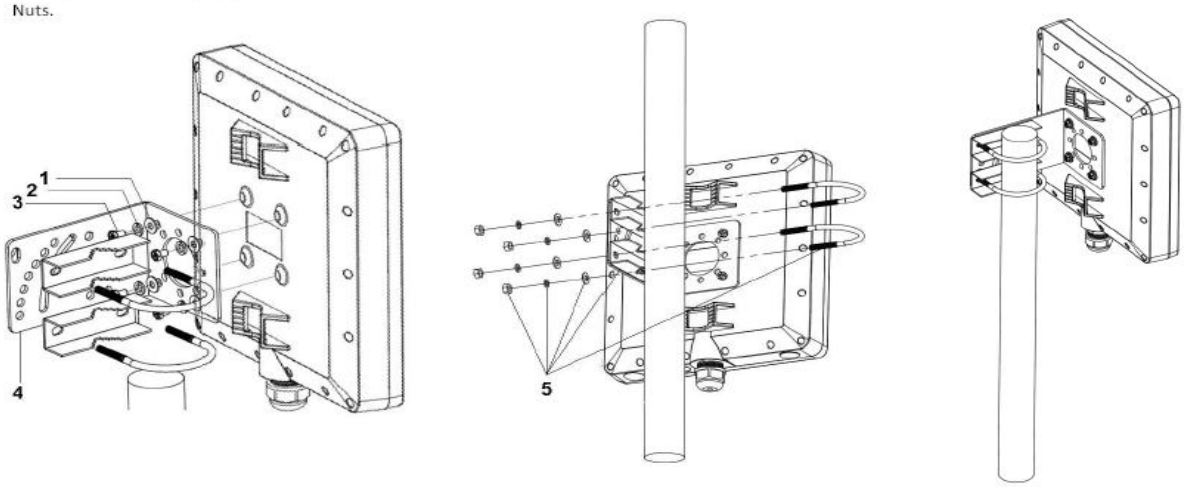
2.3 Outdoor Enclosure Installation Guide

U Type Screw installation steps:

1. Mount L Type holder with enclosure and fix it by using M5 washers, spring washers and Nuts.

2. Mount U Type Screw with pole and fix it.

3. Finish the installation.



Components:

1. M5 spring washer	4 pcs	4. L Type Mounting main holder	1 pcs
2. M5 washer	4 pcs	5. U Type Screw and kits	1 set
3. M5 Nut	4 pcs		

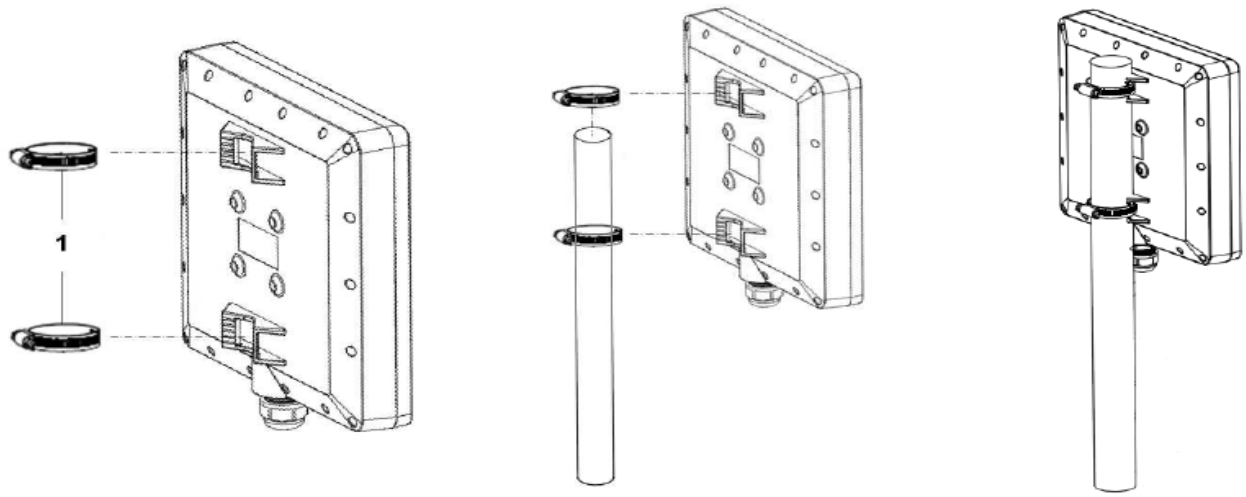
Note: Mounting Pole Diameter: 20 ~ 54 mm

Clamp Type installation steps:

1. Install iron clamps and pass through casing's holes.

2. Install the clamps to the pole, and use Screwdriver to fix it.

3. Finish the installation.



Components:

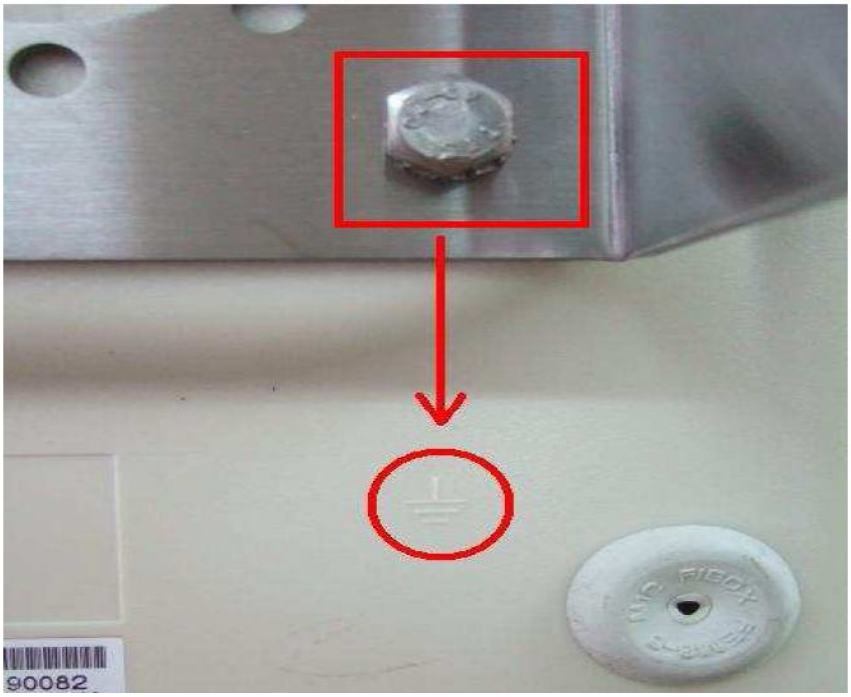
1. Clamp	2 pcs

Figure 2-6 Clamp Type Installation Steps

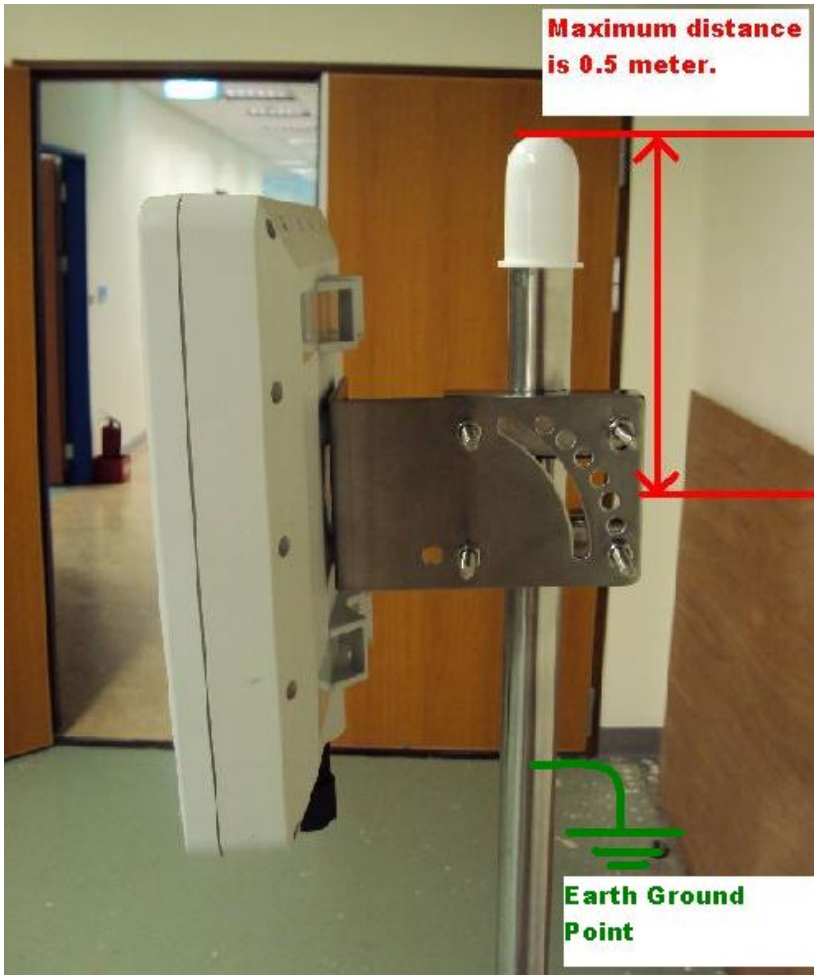
2.4 Earthing Guideline

2.4.1 Mounting Bracket

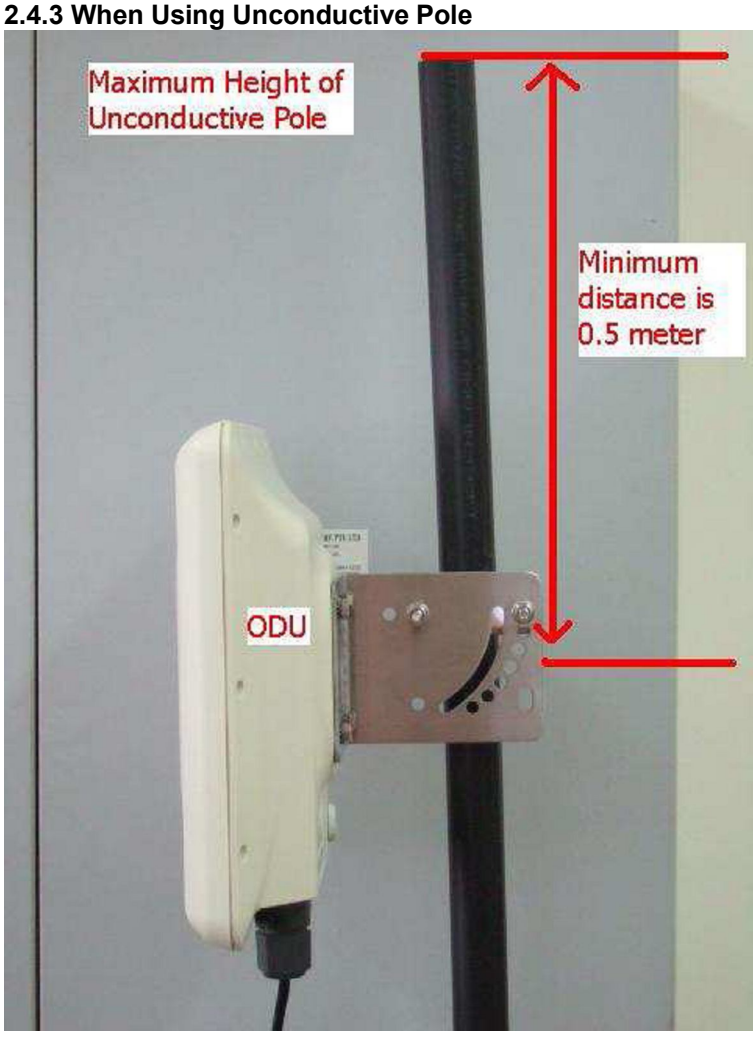
One of the screw holes is ODU grounding point. The whole bracket is grounding point after mounted to ODU. Please refer to photo below.

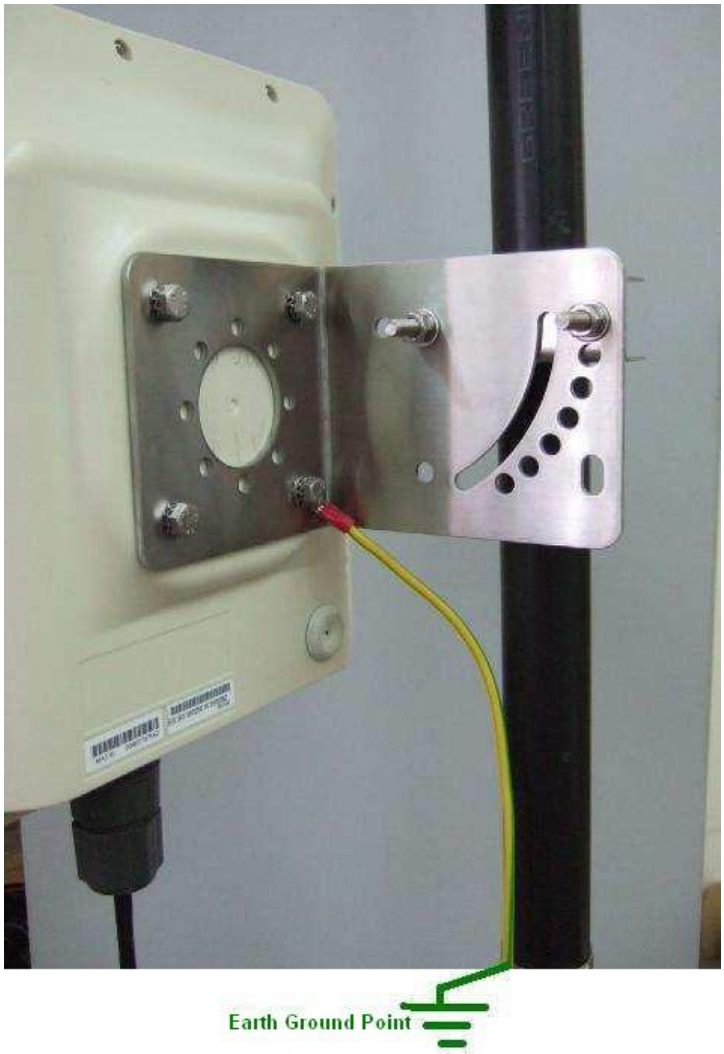


2.4.2 When Using Conductive Pole

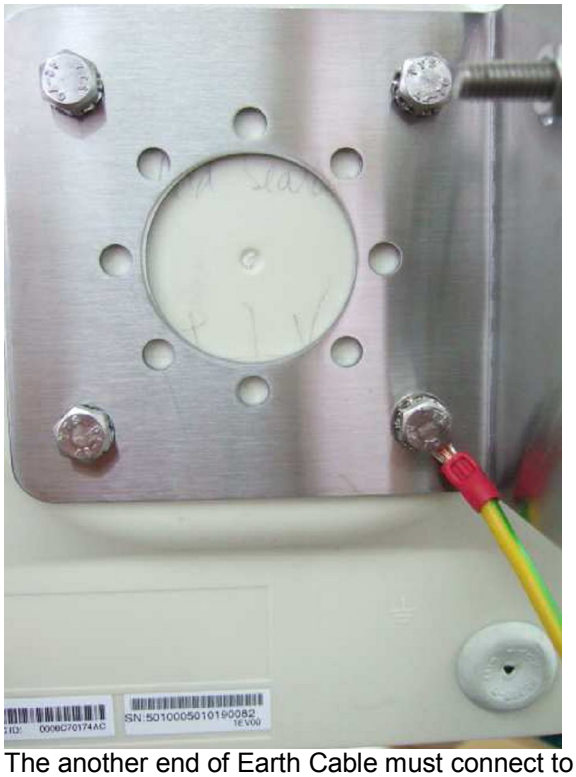


2.4.3 When Using Unconductive Pole




Earth Ground Point

Insert Earth lug to grounding point
screw and screw together to bracket



The another end of Earth Cable must connect to Building Earth point.

3 QUICK SETUP GUIDE

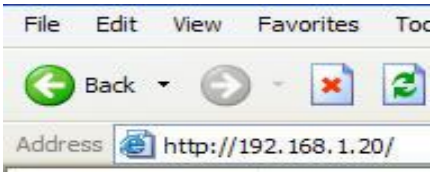
3.1 System Requirements for Configuration

- Computers with Windows, Macintosh or Linux-based operating systems and with an Ethernet adaptor
- Internet Explorer version 5.5 and above or Netscape Navigator that supports Java

3.2 Setup Guide

Step 1: Set default LAN IP address

The default LAN IP address is 192.168.1.20.



Step 2: Set password

The default login name is ADMIN, the default password is LOOP. The user name and the password are case sensitive.

Connect to 192.168.1.20
The server 192.168.1.20 at Web Server Authentication requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name:
ADMIN
Password:
Remember my password
OK
Cancel

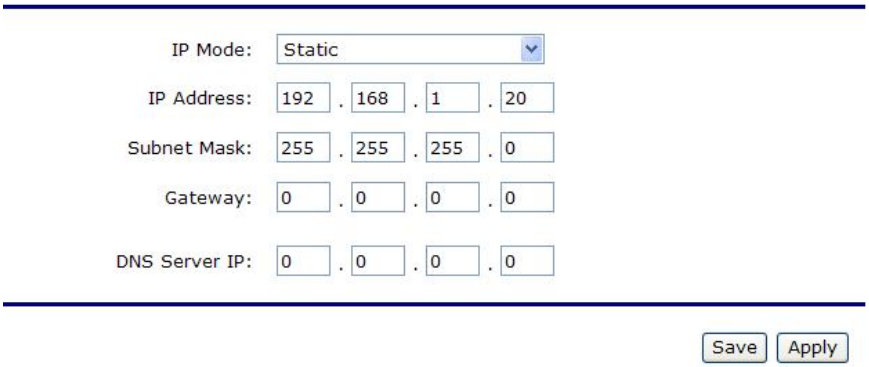
.

Step 3: Configuring AP

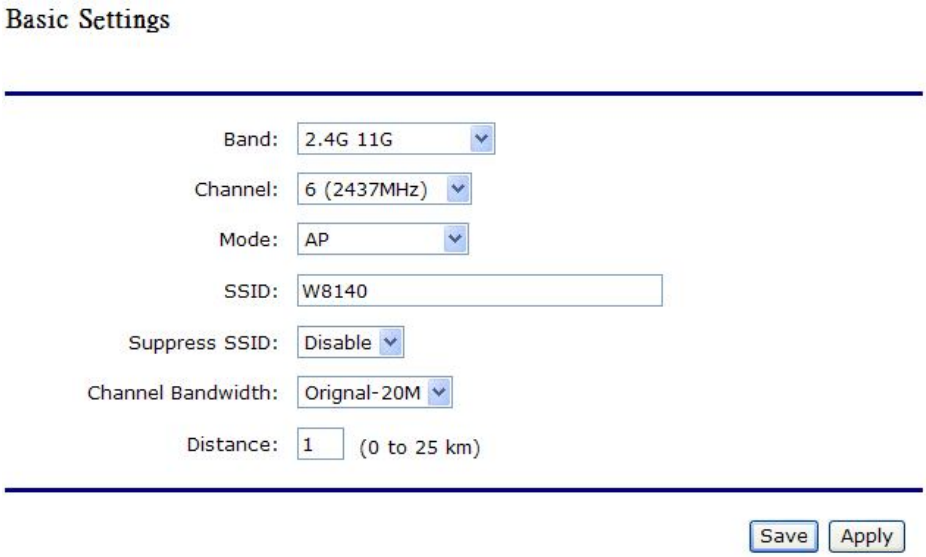
Step 3.1: Set IP configuration-IP Settings

This page allows you to choose the type of IP

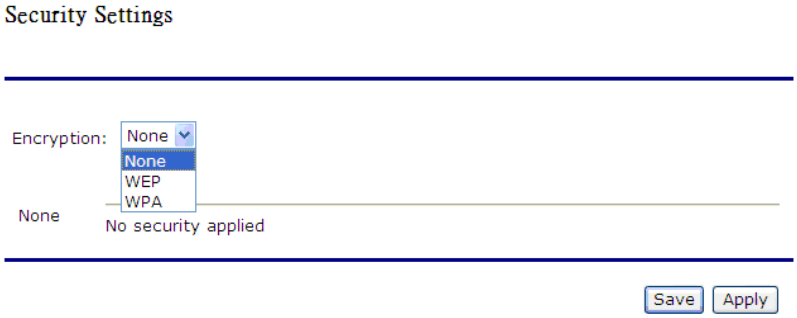
IP Settings



Step 3.2: Set operation mode-Basic Settings
This page allows you to set the outdoor as an Access Point or an Ethernet Bridge or a Repeater.



Step 4: Set security settings
This section allows you to configure wireless encryption to prevent unwelcome parties from reading your traffic.



Step 5: Reboot the AP
Reboot the system to make all the settings take effect.
Note: For detailed setup, see sections 5 and 6.

3.3 LEDs

Figure 3-1 LEDs

Name	Status	Function
PWR	Green	Power on operating
	Off	Power off or power fail
LAN	Green	Link up
	Flashing Green	Active
	Off	No Ethernet connection or link fail
WLAN	Green	RF function active
	Off	RF function fail

Table 3-1 LEDs Status

3.4 Factory Default

No	Item to Set	W8140-AP	Remark
1	Device Mode	AP mode	
2	ESSID	W8140	
3	WEP	None	
4	User ID (for configuration)	OPERATOR	
5	Password (for configuration)	LOOP	
6	Default static IP address and subnet	Enable	IP ADDR: 192.168.1.20 Subnet : 255.255.255.0 Default gateway: 0.0.0.0
7	DHCP client	Disable	With “Static IP” set on
8	DHCP server	Disable	Support address 192.168.1.1~192.168.1.100
9	Radio Power	100%	configurable
10	Radio Frequency	165	AFS enable on power on stage
11	Radio data rate	Auto	configurable
12	Super User ID (for firmware upgrade)	ADMIN	
13	Password for Super user	LOOP	

4 BASIC IP NETWORKING

IP = Internet Protocol

IP stands for Internet Protocol. In an IP network, every device has a **unique** IP Address to identify itself. There are two ways of assigning an IP address to a PC or Router: Static and Automatic (DHCP). Static IP addresses are keyed-in manually, while Dynamic IP's are distributed by a DHCP Server.

Ports

Every packet of traffic is identified by its Source and Destination Addresses, which would ensure that the packet arrives at the correct destination. A Port Number is also embedded in each packet; to identify which software application that generated and uses that packet. Therefore, if it blocks a certain port number, it denies the particular software from using the connection.

Static IP Address

Static IP addressing ensures that the device will always have the same IP address. Static addressing is commonly used for your servers.

Dynamic IP Address

A dynamic IP address is one that is automatically assigned to a PC. These IP addresses are "dynamic" because they are only temporarily leased to the PC when it connects to the network. This is the most convenient and common way of managing IP addresses in a network. The Server that manages this pool of IP addresses is called the DHCP Server.

DHCP (Dynamic Host Configuration Protocol)

The PC obtaining an IP address from the Server is called the DHCP Client. If there is already a DHCP Server running on your network, you must disable one of the two DHCP servers. Running more than one DHCP server together will cause network problems!

Wireless LAN Basics

A Wireless LAN (WLAN) is a computer network that transmits and receives data with radio signals instead of using cables. WLANs have become common in homes, offices, airports and public Hotspots. WLAN can support the same applications and software that run on a wired network (LAN). Besides supporting the same software and functions, WLAN brings greater convenience and eliminates the need to lay Ethernet cables in a home or office.
The AP can even support 108Mbps wireless data rate at Turbo mode. This is only applicable for user using recommended Turbo-capable Cardbus (with Atheros chipset).
WLAN networking involves a few additional parameters to be configured.

SSID

The SSID is the "network name" for the WLAN network. The SSID is any name, and can be any set of characters or numbers. The Client sniffs the radio frequencies for an AP with the same SSID with itself. The client locks onto the AP and they are "**associated**".
To enable plug-and-play convenience, most client cards can sniff the frequencies to extract the available SSIDs to let the user choose from.

Encryption

WLAN traffic can be captured by anybody to be read! The solution is to use encryption to make the traffic appear as random characters to the eavesdropper. Both the AP and client must use the same encryption standard and key to enable them to decode the "rubbish". If the encryption settings are mismatched, the client and AP cannot associate. WEP (Wired Equivalent Privacy) is the most common WLAN encryption standard.

Channel

The frequency is selected by AP or by Master mode, and the frequency of Client or Slave mode should follow AP or Master mode. Or you could selected auto channel to search the frequency.

Signal Strength

Radio signals drop in power over a distance. Even if all the settings are correct, low signal strength makes association impossible. The usable distance between the AP and client can range from a few meters indoor to a few km. When setting up the client, make sure that you:

- Keep at a distance between the AP and the clients.
- Make sure that the WLAN signals do not have to pass through too many concrete walls and metal structures to reach the client.
- Make sure that client(s) is (are) located far away from one another to avoid interference.
- Make sure that there is line of sight between the AP and client device.

Interference

Interference happens when 2 clients with the same channels are placed near to one another. The speed of the network drops and the signal strength fluctuates wildly.

MIMO

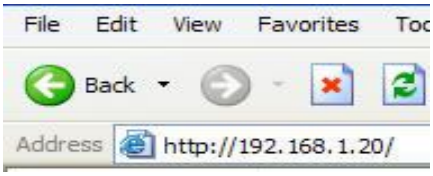
In radio, multiple-input and multiple-output, or MIMO is the use of multiple antennas at both the transmitter and receiver to improve communication performance. It is one of several forms of smart antenna technology.

5 GETTING STARTED

Connect the network as shown previously.

Note: If your PC is wireless, check the card utility of the PC to make sure that the signal strength is good and that the bottom LED lights up on the AP.

Open a Web browser (Internet Explorer, Netscape etc.).
Type the AP LAN IP **(192.168.1.20)** address into the browser's Address field. The default LAN IP address is 192.168.1.20.



6 CONFIGURATION MENU

All functions and settings of this access point must be configured via web management interface. Please start your web browser, and input “192.168.1.20” in address bar, then the following message should be shown:

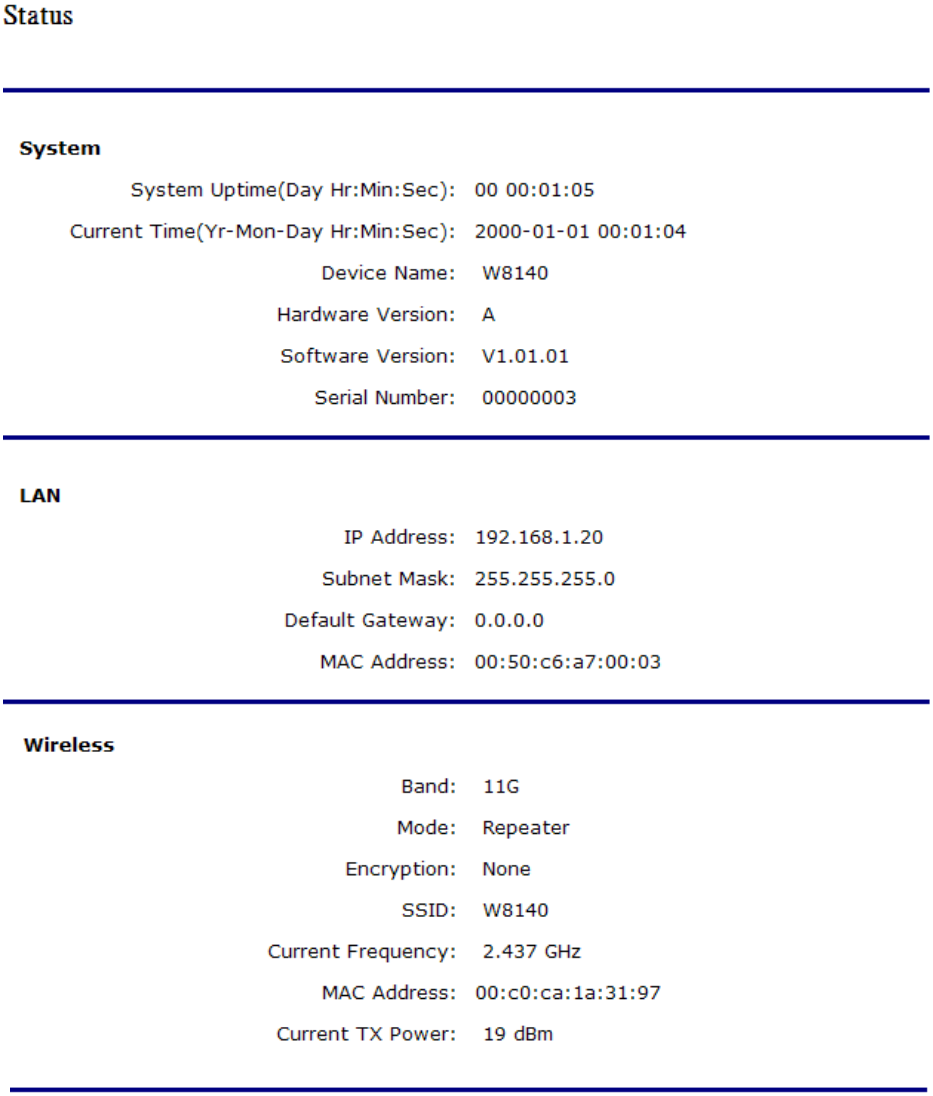
Connect to 192.168.1.20
The server 192.168.1.20 at Web Server Authentication requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name:
ADMIN
Password:
Remember my password
OK
Cancel

User name	Password
ADMIN	LOOP
OPERATOR	LOOP

Table 6-1 User name and Password

Note: User ADMIN could upgrade firmware but user OPERATOR could not.

After you log in, you can see the web management interface of this access point.



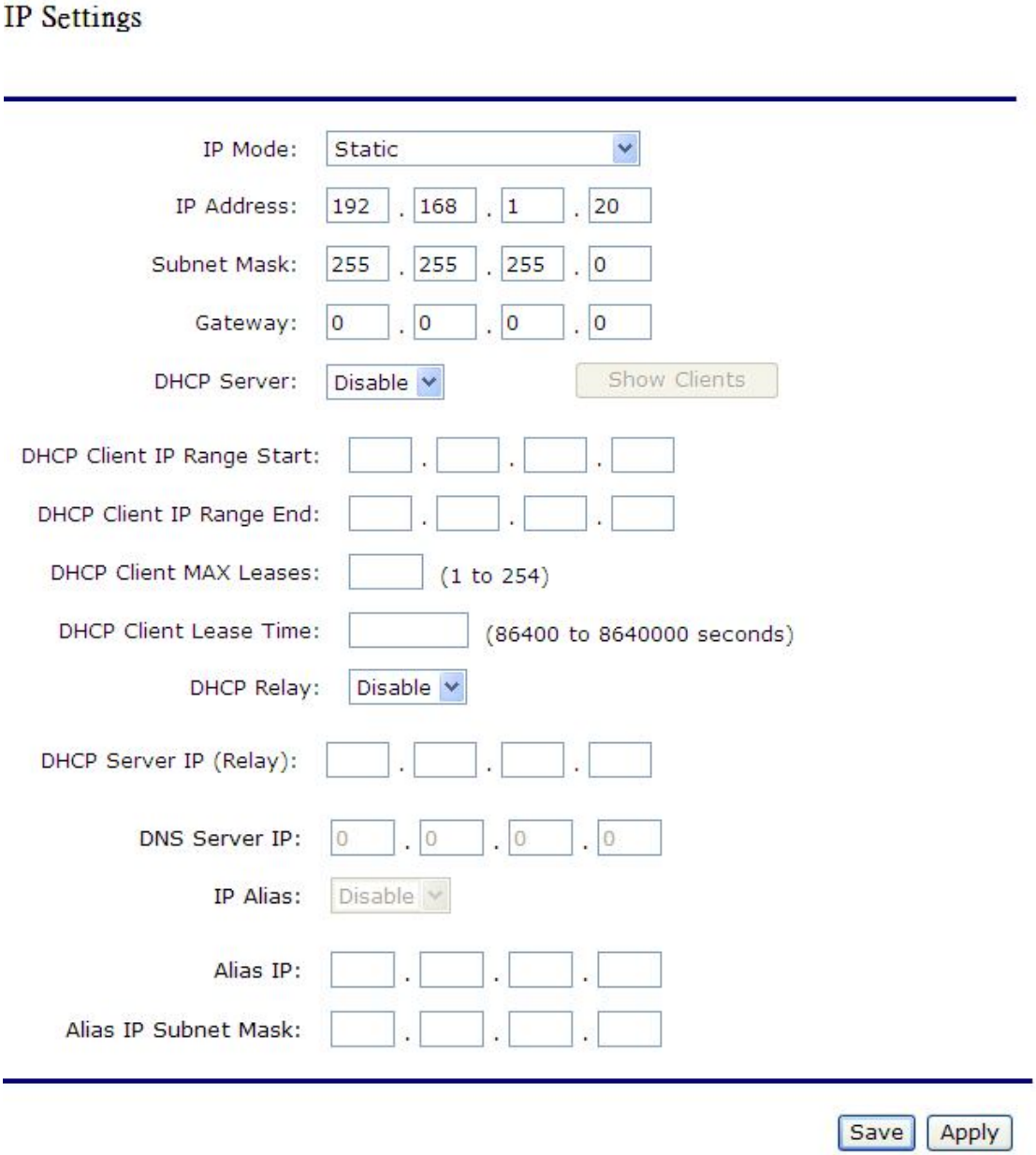
After you connected to the access point by web browser, the first page you see is “Status”. All system and network related information of this access point will be displayed here. The information is very helpful when you want to know the detailed information of your access point, and when you try to fix the communication problem between this access point and other wired / wireless computer / devices.

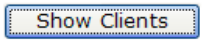
6.1 Network

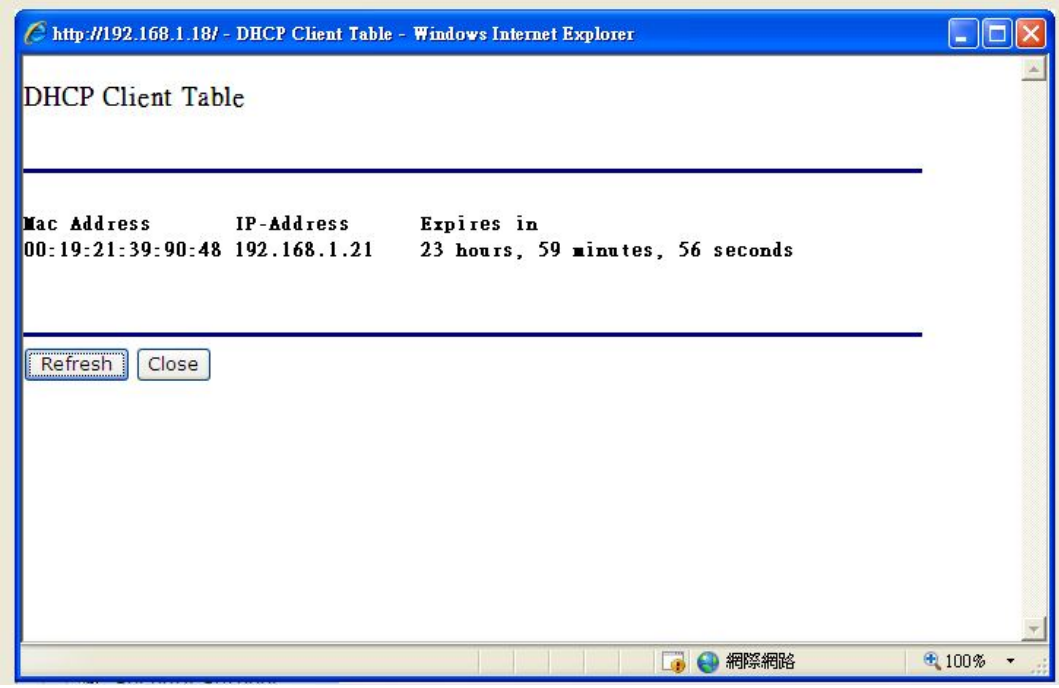
6.1.1 IP Settings

In every Web Configuration page, the left panel is the navigation menu containing the main sections. The right-side frame is where the detailed configuration is done.
This page allows you to choose the type of IP.

Static IP Mode: When you boot up the W8140 for the first time, it is in Static mode. You assign a Static IP to the device. The default IP address, subnet mask and gateway are 192.168.1.20, 255.255.255.0 and 0.0.0.0.

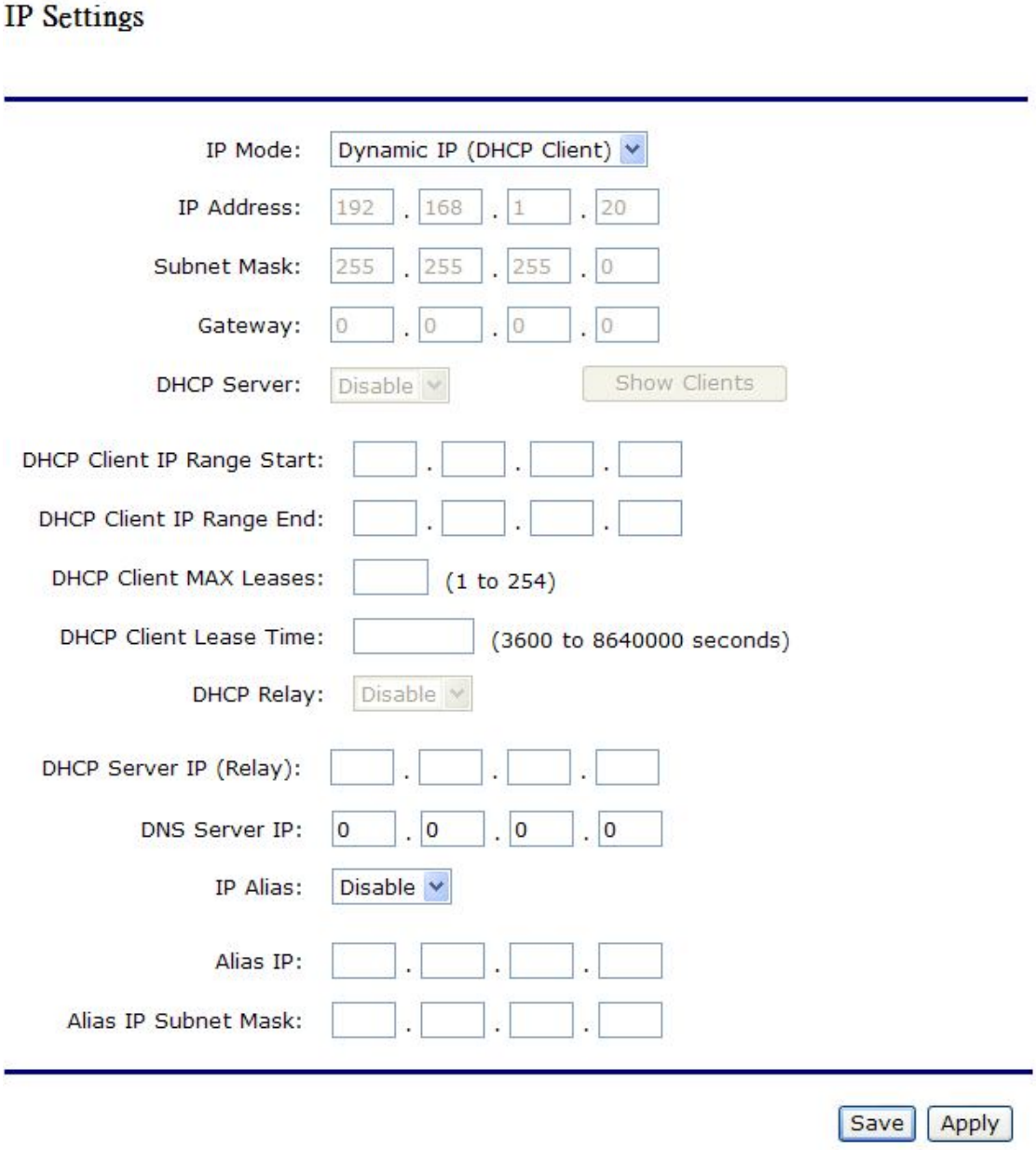

IP Settings
IP Mode: Static
IP Address: 192 . 168 . 1 . 20
Subnet Mask: 255 . 255 . 255 . 0
Gateway: 0 . 0 . 0 . 0
DHCP Server: Disable
Show Clients
DHCP Client IP Range Start:
DHCP Client IP Range End:
DHCP Client MAX Leases:
(1 to 254)
DHCP Client Lease Time:
(86400 to 8640000 seconds)
DHCP Relay: Disable
DHCP Server IP (Relay):
DNS Server IP: 0 . 0 . 0 . 0
IP Alias: Disable
Alias IP:
Alias IP Subnet Mask:
Save
Apply

DHCP Server: If you choose Enable for DHCP Server, please assign the DHCP Client IP Range, DHCP Client MAX Leases, and DHCP Client Lease Time to the device. If you choose Enable for DHCP Server, you could click on  to show assigned clients.



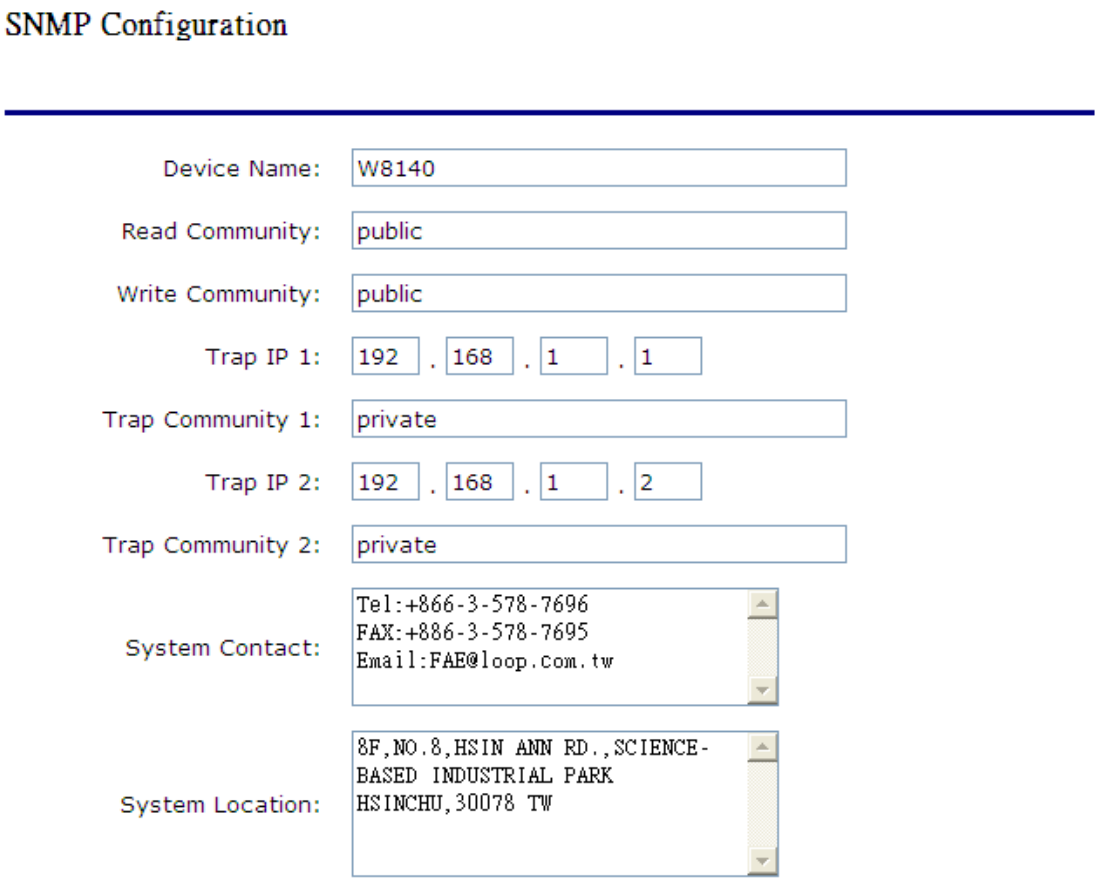
DHCP Relay: If you choose Enable for DHCP Relay, please assign the DHCP Server IP (Relay) to the device.

Dynamic IP Mode (DHCP Client): If the Dynamic IP is chosen, the W8140 will obtain an IP Address from an upstream DHCP Server.



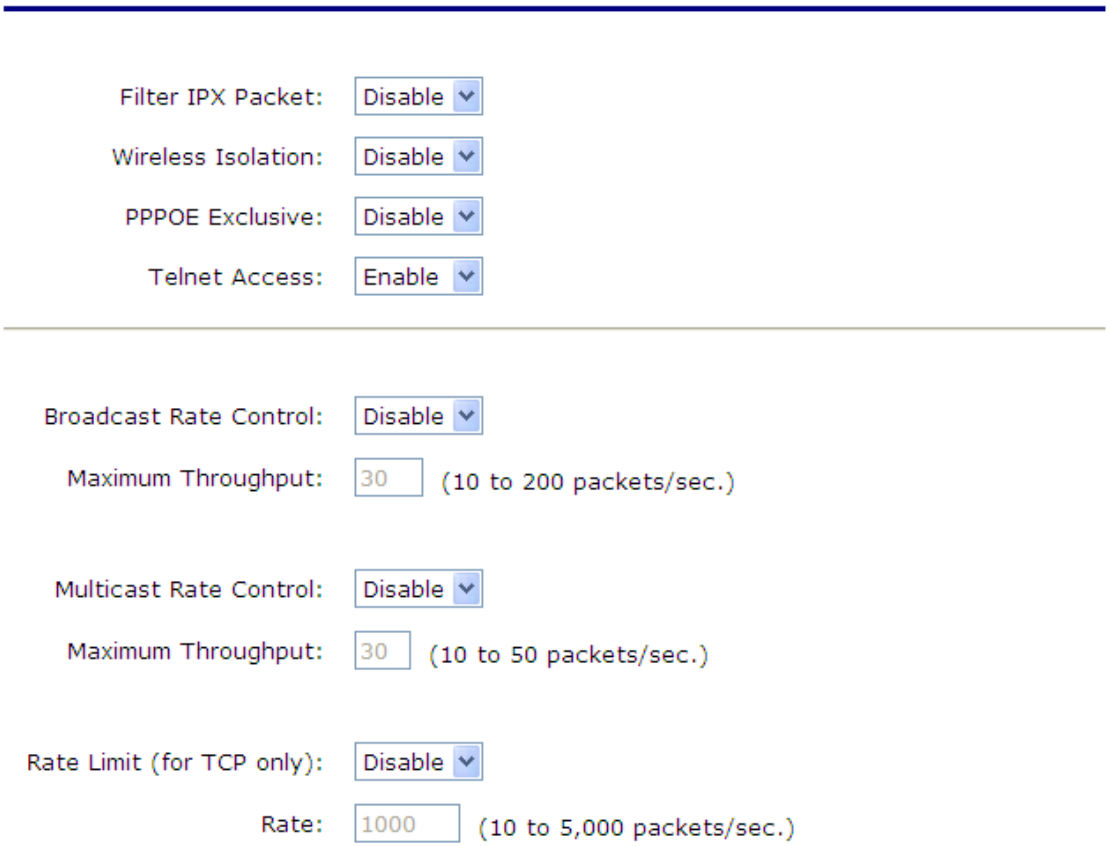
IP Alias: If you choose Enable for IP Alias, please set Alias IP and Alias IP Subnet Mask for the device when DHCP Client selected.

6.1.2 SNMP Configuration



Device Name: Displays the name of the device.
Read Community: The SNMP Client with this “passphrase” will have “Read” access.
Write Community: The SNMP Client with this “passphrase” will have “Write” access.
Trap IP: The destination IP address to send trap information of the device. You can send trap information to the 2 different destination IP addresses.
Trap Community: The device, SNMP agent, have the same string of SNMP Manager will be allowed all traps or authenticated traps by SNMP Manager but also on your device you have to specify a trap destination IP.
System Contact: To set the MIB2 system Contact OID value.
System Location: To set the MIB2 system Location OID value.

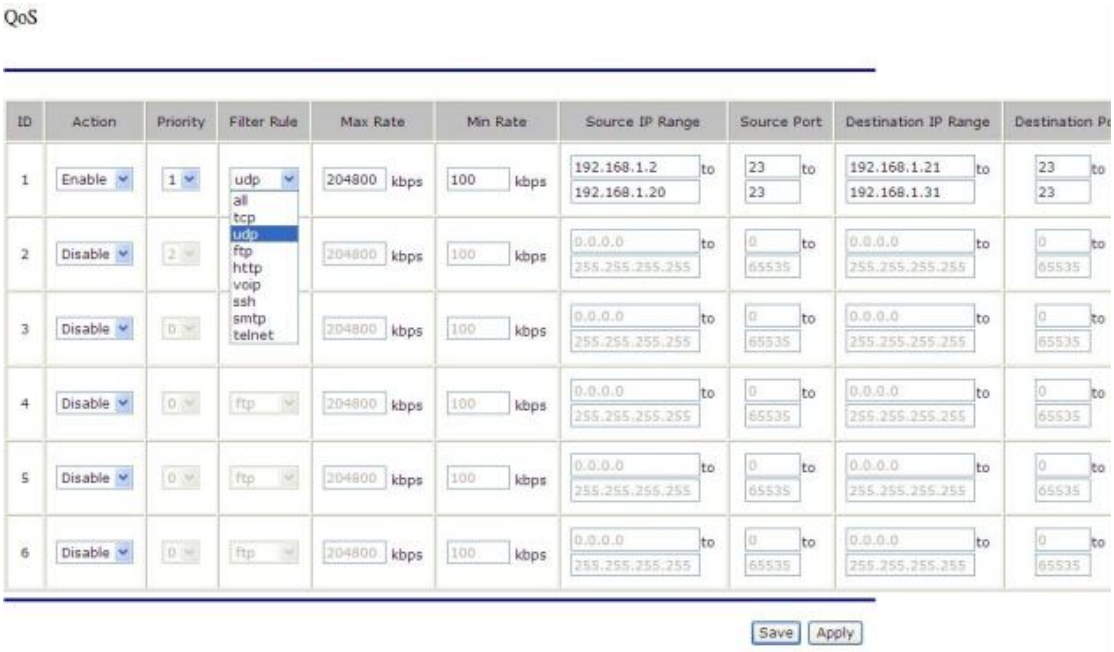
6.1.3 Protocol Filter Setting


Filter IPX Packet: Disable
Wireless Isolation: Disable
PPPOE Exclusive: Disable
Telnet Access: Enable
Broadcast Rate Control: Disable
Maximum Throughput: 30 (10 to 200 packets/sec.)
Multicast Rate Control: Disable
Maximum Throughput: 30 (10 to 50 packets/sec.)
Rate Limit (for TCP only): Disable
Rate: 1000 (10 to 5,000 packets/sec.)

Filter IPX Packet: Selecting Disable to control IPX packets to pass through.
Wireless Isolation: Selecting this option will control wireless clients associated with this device to communicate with each other.
PPPOE Exclusive: Selecting Disable to control PPPOE to pass through.
Telnet Access: Selecting this option will control telnet access.
Broadcast Rate Control: Selecting this option will control broadcast rate.
Maximum Throughput: Select a number in from 10 to 200 (packets/sec.).
Multicast Rate Control: Selecting this option will control multicast rate.
Maximum Throughput: Select a number in from 10 to 50 (packets/sec.).
Rate Limit (for TCP only): Selecting this option will limit the rate on TCP.
Rate: Select a number in to set the rate from 10 to 5000 (packets/sec.).

Note: For description for acronym, please refer to Glossary.

6.1.4 QoS



Action: Choose to enable the action.
Priority: Select from 0 to 9 of priority. 0 is the top priority.
Filter Rule: Available options are: all, tcp, udp, ftp, http, voip, ssh, smtp and telnet.
Max Rate: Select a number for max rate.
Min Rate: Select a number for min rate.
Source IP Range: Select the IP range from 0.0.0.0 to 255.255.255.255 for all, udp, and tcp filter rules.
Source Port: Select the source port from 0 to 65535 for all, udp, and tcp filter rules.
Destination IP Range: Select the IP range from 0.0.0.0 to 255.255.255.255 for all, udp, and tcp filter rules.
Destination Port: Select the destination port from 0 to 65535 for all, udp, and tcp filter rules.

Note: In this case, enabled udp of filter rule for the first priority. Set the rate between 100 and 204800. IP range set between 192.168.1.2 and 192.168.1.20. Set Source port and destination port 23 to 23. Destination IP range set between 192.168.1.21 and 192.168.1.31.

6.2 Wireless

6.2.1 Basic Settings

This access point can be operated in different modes; you can click “Basic Setting” on the left of web management interface to select an operating mode you want to meet for different need:

6.2.1.1 Operation mode: AP

Band: a/b/g

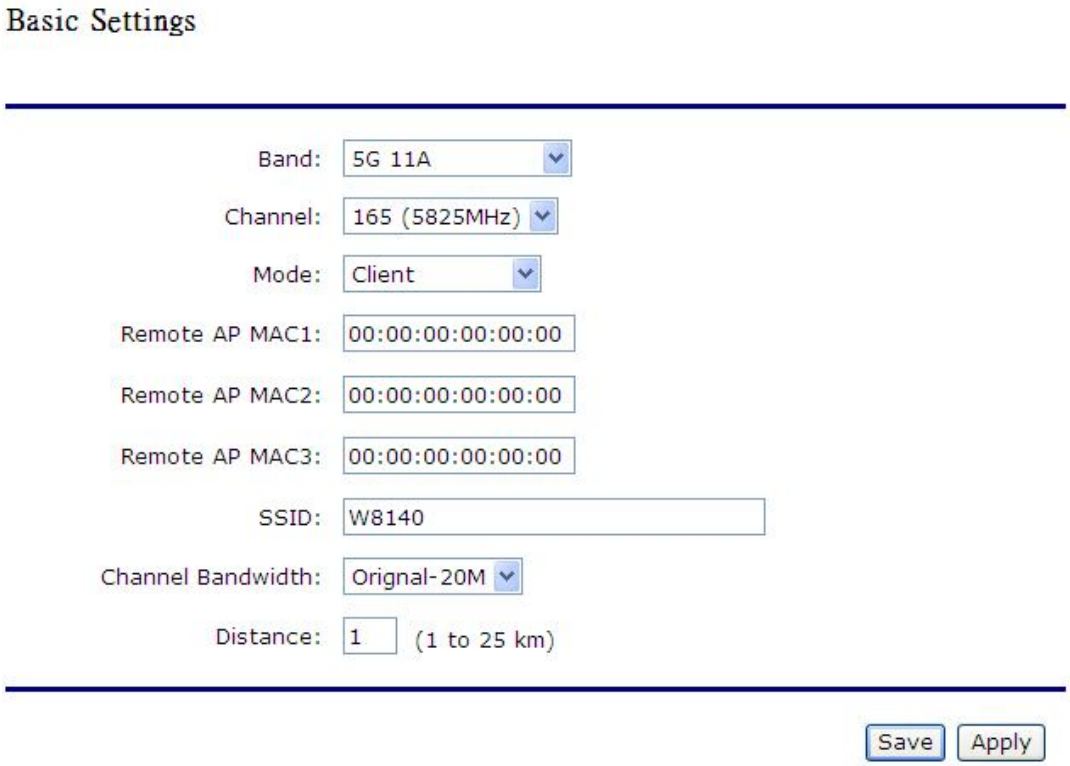
Band: You can choose 5G 11A, 5G 11 Turbo A, 2.4G 11B, 2.4G 11G, 2.4G 11 Turbo G. Please select the wireless band you wish to use. By selecting different band setting, you’ll be able to allow or deny the wireless client of a certain band.
Channel: There are different channels list choose able. You can choose to set the frequency channel to use or use Auto for automatic channel selection.
Mode: AP
The AP can be used as an Access Point or as a Client (Ethernet Bridge).
SSID: Service Set Identifier (SSID) is a sequence of characters that uniquely names a Wireless LAN. This name allows PCs to connect to the correct Wireless Access Point when multiple Access Points operate in the same location. The default SSID is W8140.
Suppress SSID: SSID suppression is used to disable the broadcasting of the SSID.
Channel Bandwidth: Choose from below: Original-20M, Half-10M, or Quarter-5M.
Distance: This is to set the distance for bridging. You must choose the appropriate distance according to the actual environment set up to get better performance. For example, if the actual distance is 3.3 km, you need to set 4 km to get a better performance.

Band: n

Band: You can choose 5G 11A, 2.4G 11B, 2.4G 11G, 5G 11NA HT20, 5G 11NA HT40+, 5G 11NA HT40-, 2.4G 11NG HT20, 2.4G 11NG HT40+, 2.4G 11NG HT40-. Please select the wireless band you wish to use. By selecting different band setting, you'll be able to allow or deny the wireless client of a certain band.

6.2.1.2 Operation mode: Client

Band: a/b/g



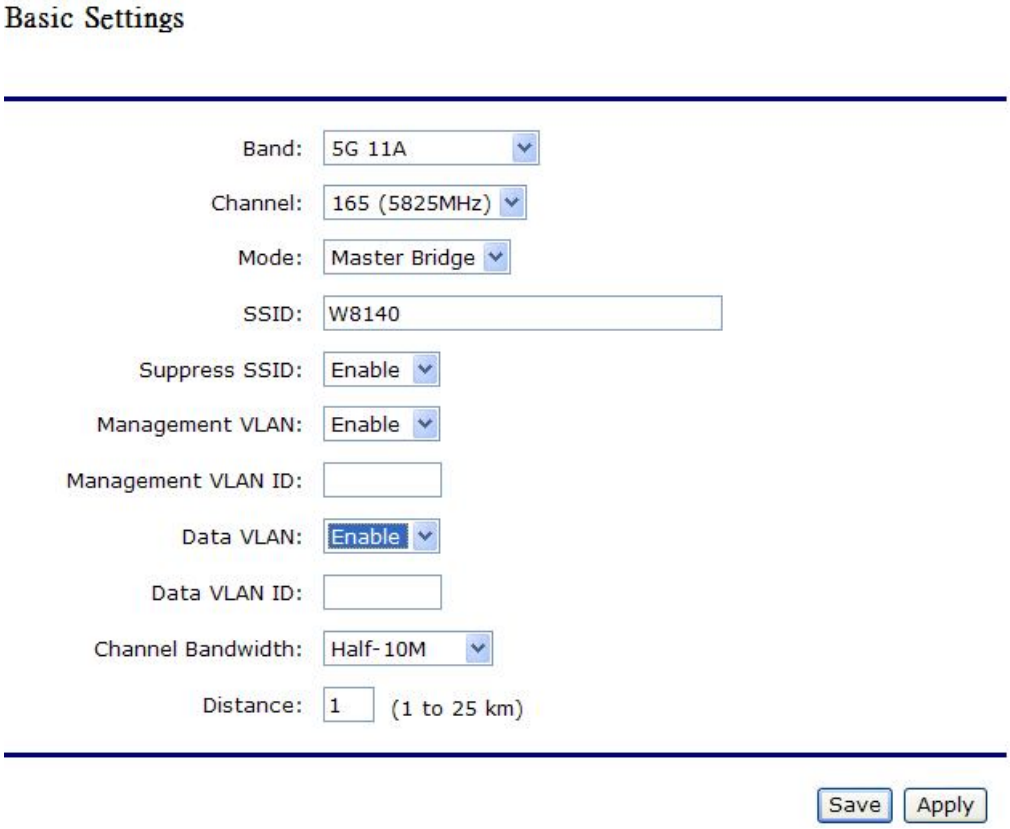
Remote AP MAC: Please input the MAC address of the wireless of the wireless access point you wish to connect.

Band: n

Note: For description of other options, please refer to operation mode: AP.

6.2.1.3 Operation mode: Master Bridge

Band: a/b/g

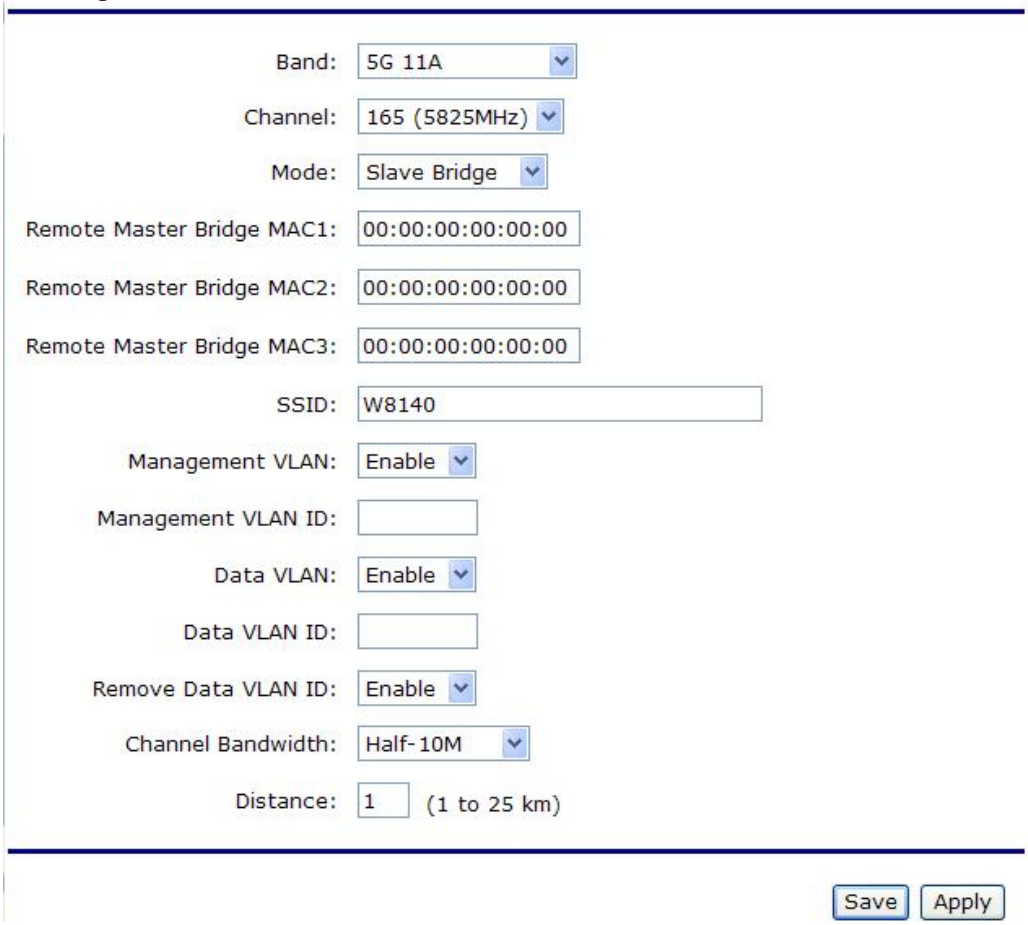


Management VLAN: To enable or disable management VLAN. User must stay in the same VLAN or use VLAN switch to control the device.
Management VLAN ID: Please put the management VLAN ID here.
Data VLAN: To enable or disable data VLAN.
Data VLAN ID: Please put the data VLAN ID here.
Note: For description of other options, please refer to operation mode: AP.

Band: n

6.2.1.4 Operation mode: Slave Bridge

Band: a/b/g



Remote Master Bridge MAC: Please input the MAC address of the wireless access point you wish to connect.

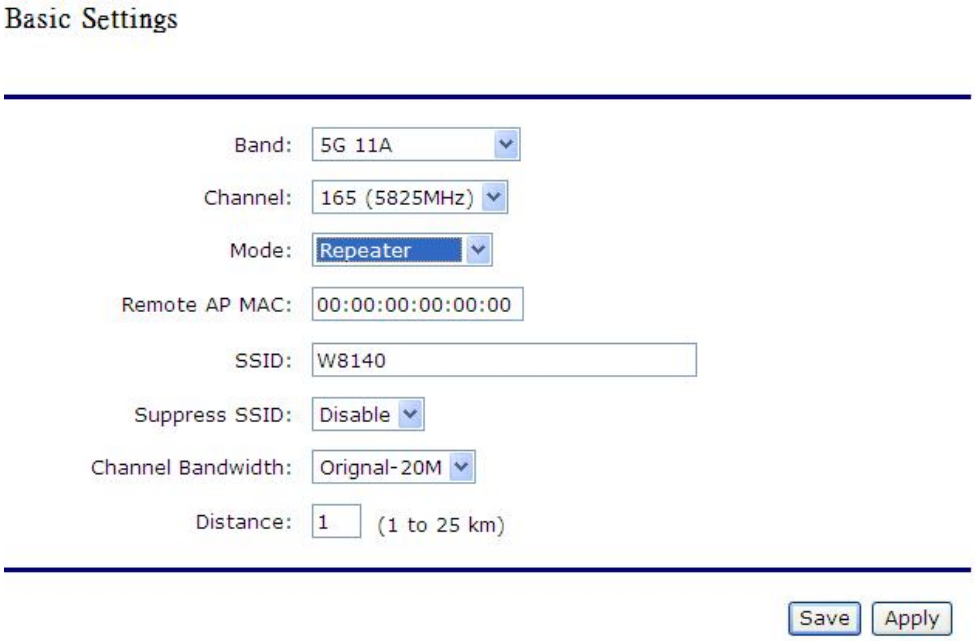
Remove Data VLAN ID: To enable or disable this function.

Band: n

Note: For description of other options, please refer to operation mode: AP.

6.2.1.5 Operation mode: Repeater

Band: a/b/g



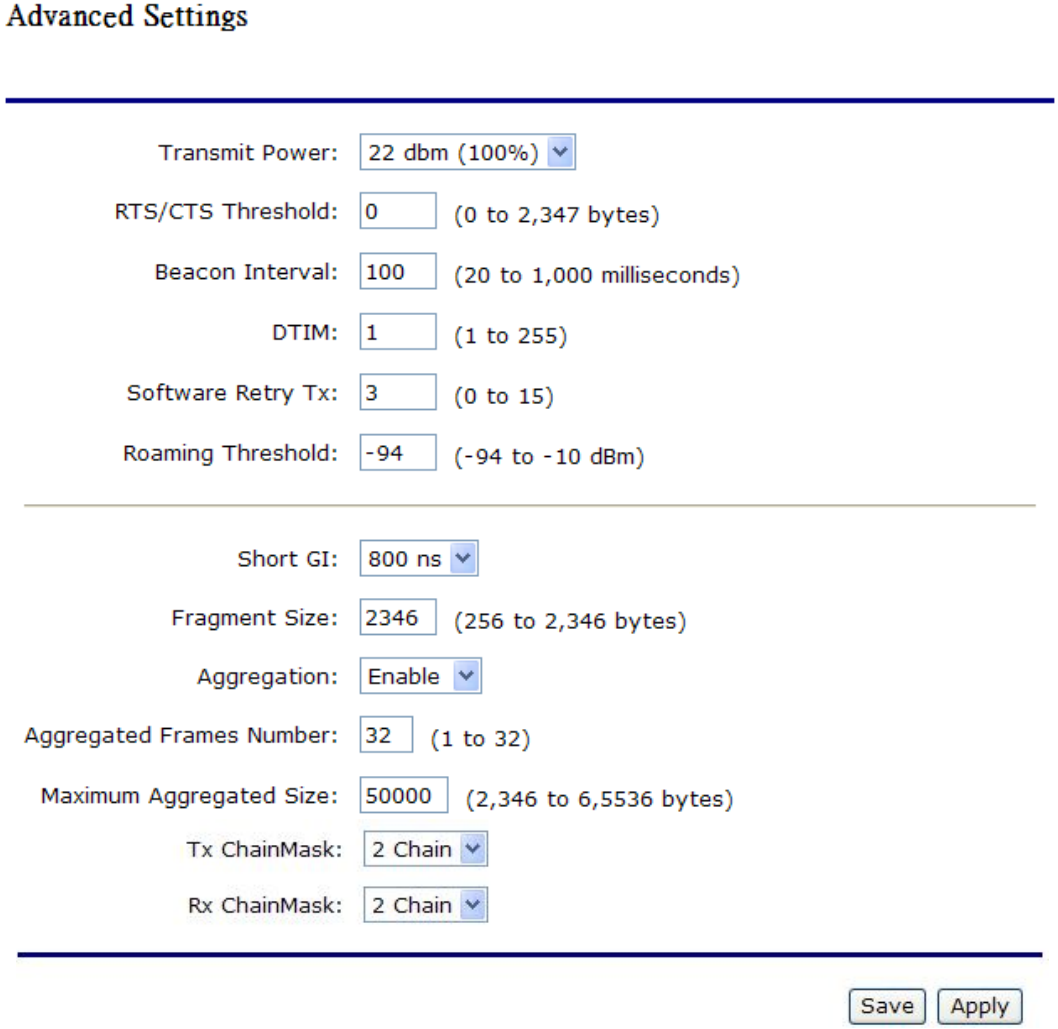
Remote AP MAC: Please input the MAC address of the wireless access point you wish to connect.

Band: n

Note: For description of other options, please refer to operation mode: AP.

6.2.2 Advanced Settings

This wireless access point has many advanced wireless features. Please note that all settings listed here are for experienced users only, if you're not sure about the meaning and function of these settings, please don't modify them, or the wireless performance will be reduced.


Advanced Settings
Transmit Power: 22 dbm (100%)
RTS/CTS Threshold: 0 (0 to 2,347 bytes)
Beacon Interval: 100 (20 to 1,000 milliseconds)
DTIM: 1 (1 to 255)
Software Retry Tx: 3 (0 to 15)
Roaming Threshold: -94 (-94 to -10 dBm)
Short GI: 800 ns
Fragment Size: 2346 (256 to 2,346 bytes)
Aggregation: Enable
Aggregated Frames Number: 32 (1 to 32)
Maximum Aggregated Size: 50000 (2,346 to 6,5536 bytes)
Tx ChainMask: 2 Chain
Rx ChainMask: 2 Chain
Save
Apply

Transmit Power: Sometimes, it is useful to decrease the coverage range of each AP, so that more APs can be located together without interference to one another. The default transmission power is maximum transmit power (dbm) allowed in your regulatory domain.
RTS/CTS Threshold: You can set the packet size (0~2347) at which the device will issue a request to send (RTS) before sending the packet.
Beacon Interval: Select a number in from 20 to 1000. Low Beacon Interval will make the association and roaming process very responsive. However, throughput will decrease, so it is necessary to strike a balance. Typical Beacon Interval is set to 100 ms.
DTIM: DTIM stands for delivery traffic indication message. Select a number in from 1 to 255. This is always a multiple of the beacon interval. It determines how often the beacon contains a DTIM. The DTIM tells power-save client devices that a packet is waiting for them.
Software Retry Tx: You can set a number of software transmission retry between 0 to 15. Default is 3.
Short GI: GI stands for Guard Interval. In telecommunications, guard intervals are used to ensure that distinct transmissions do not interfere with one another.
Fragment Size: Displays the fragment size. The more the fragment size, the quicker the transmission speed.
Aggregation: If you choose Enable for Aggregation Size, please set Aggregated Frames Number & Maximum Aggregated Size below.
Tx ChainMask: Tx stands for transmit chain. Here shows the Tx chainmask numbers.
Rx ChainMask: Rx stands for receive chain. Here shows the Rx chainmask numbers.

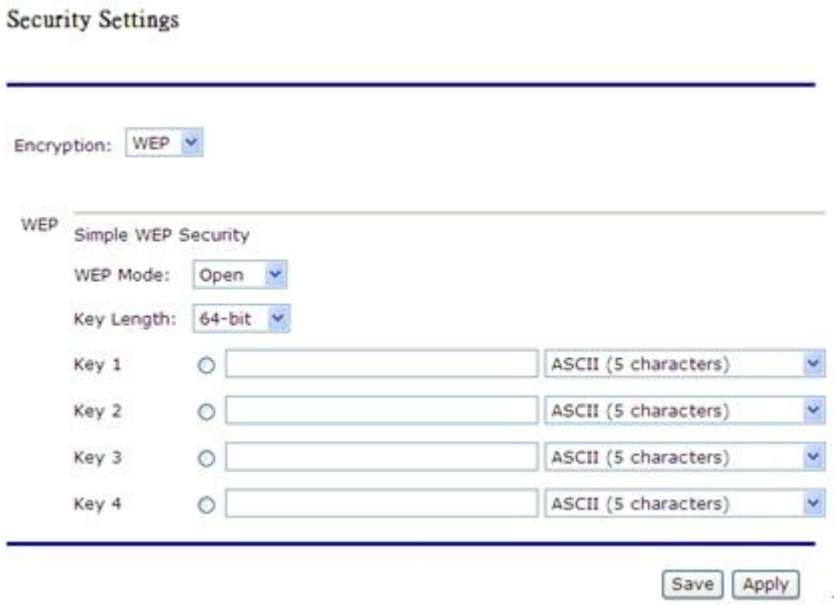
6.2.3 Security Setting

This section allows you to configure wireless encryption to prevent unwelcome parties from reading your traffic. Authentication can also be configured to block outsiders from accessing your network. Please refer to the following sections for detailed instructions.

Encryption: Select to apply security mode.
None: No wireless security.

6.2.3.1 WEP Security

WEP stands for Wired Equivalent Privacy. It is a common encryption mode. It is safe enough for home and personal use. But if you need higher level of security, please consider using WPA encryption (see next section).
When you select "WEP" as encryption type, the following messages will be displayed:

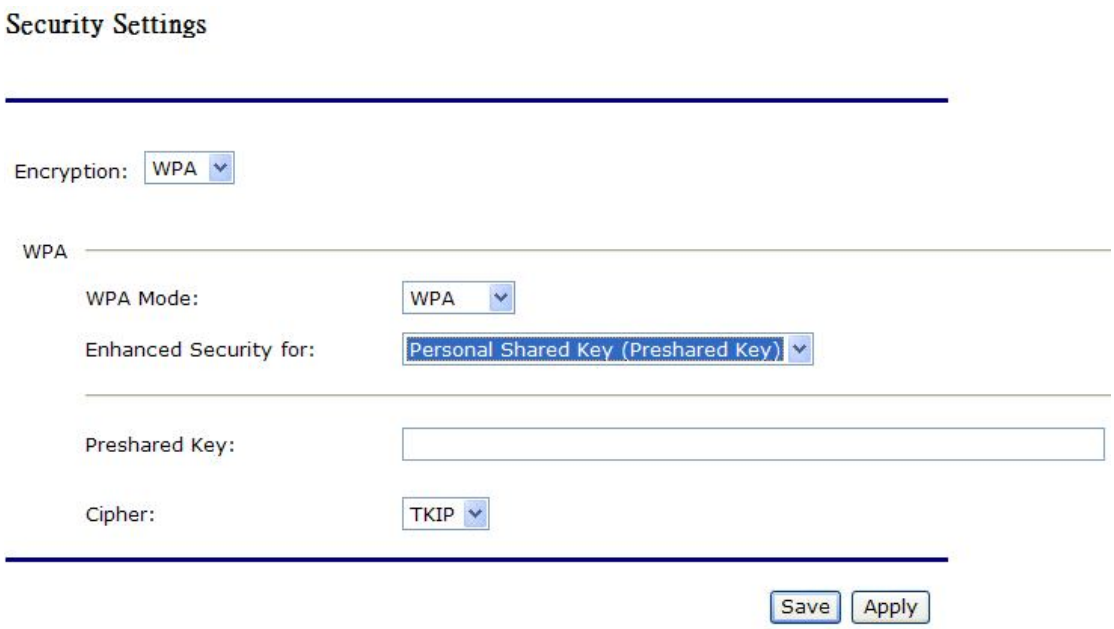


WEP Mode: Choose Open, Shared or Auto.
Key Length: Choose the number of bit for the encryption key. There are three types of WEP key length: 64-bit encryption, 104-bit encryption, and 128-bit encryption. Using 128-bit is safer than 64-bit, but it will reduce some data transfer performance.
Key Entry Method: Choose Hexadecimal if you want to enter the Keys in hexadecimal format. Otherwise, choose ASCII Text to enter the Key in ASCII format. ASCII is also called Alphanumeric in some systems. Use the same key format for the AP and Client.
Default Shared Key: This option let you choose which key id to be used for encrypting wireless data on the network.
Encryption Key: Enter the encryption key.

Note: **Hexadecimal Characters:** 0,1,2,3,4,5,6,7,8,9 and a,b,c,d,e,f
ASCII Characters: 0,1,2,……8,9 and a,b,c,d,…….x,y,z

6.2.3.2 WPA/WPA-PSK Security

WPA Pre-shared key is the safest encryption method currently, and it's recommended to use this encryption method to ensure the safety of your data.
When you select "WPA-PSK" as encryption type, the following message will be displayed:

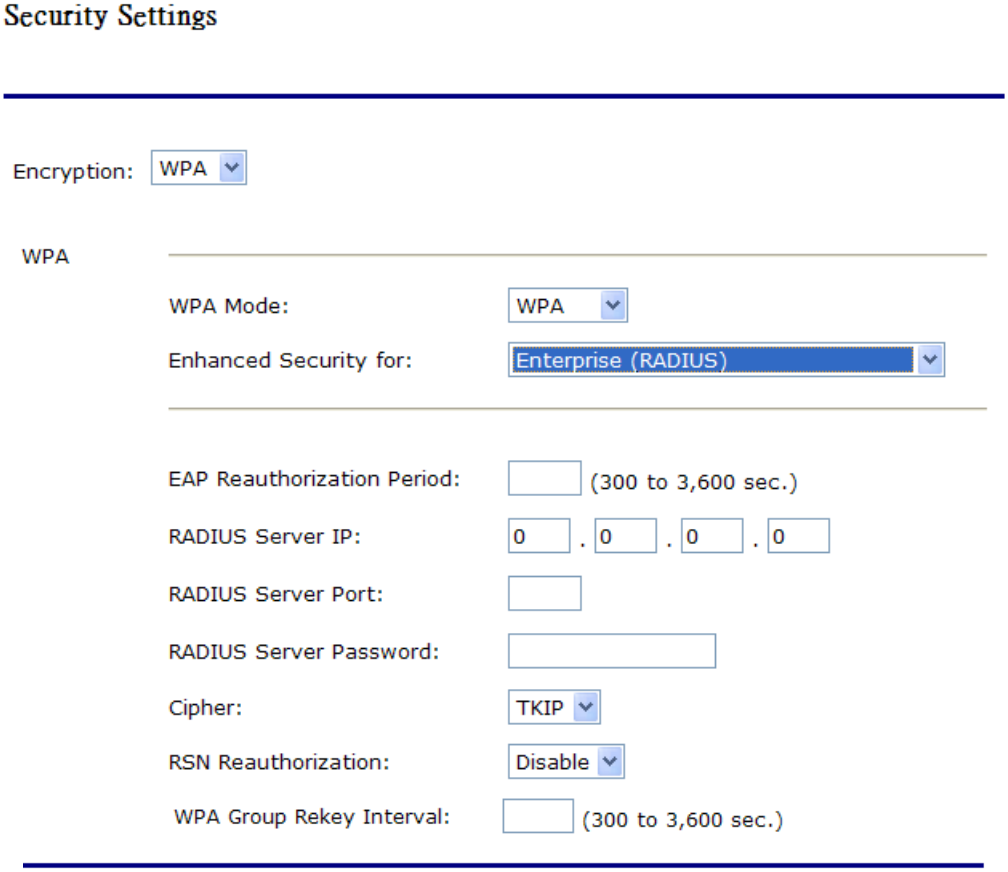


WPA Mode: Select to apply WPA security.
Enhanced Security for: for Personal Shared Key
Preshared Key: Enter a Paraphrase which is an alphanumeric phrase password between 8 to 64 ASCII characters. That allows a wireless WPA client with the same security key to connect the AP.
Cipher: Available options are: TKIP, AES and Auto. Please select one of them.

6.2.3.3 WPA/WPA-RADIUS Security

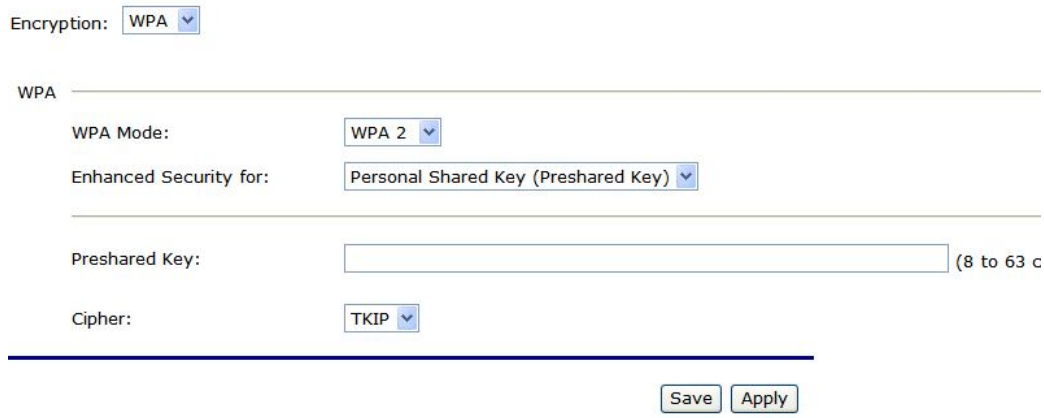
WPA RADIUS is the combination of WPA encryption method and RADIUS user authentication. If you have a RADIUS authentication server, you can check the identification of every wireless client by user database.

When you select “WPA RADIUS” as encryption type, the following message will be displayed:


Security Settings
Encryption: WPA
WPA
WPA Mode: WPA
Enhanced Security for: Enterprise (RADIUS)
EAP Reauthorization Period: (300 to 3,600 sec.)
RADIUS Server IP: 0 . 0 . 0 . 0
RADIUS Server Port:
RADIUS Server Password:
Cipher: TKIP
RSN Reauthorization: Disable
WPA Group Rekey Interval: (300 to 3,600 sec.)

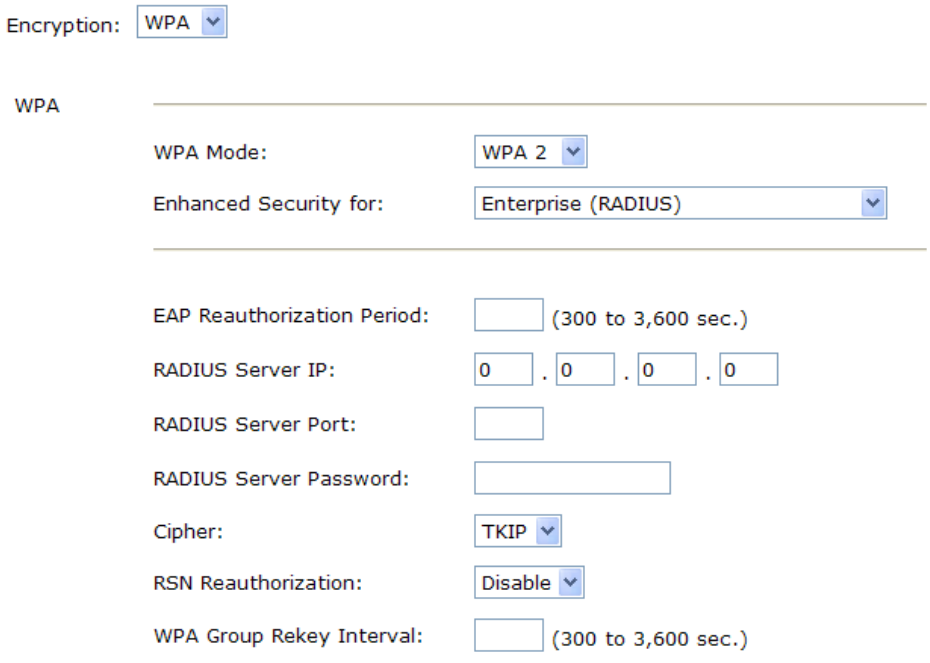
WPA Mode: Select to apply WPA security.
Enhanced Security for: RADIUS
EAP Reauthorization Period: Select from 300 to 3600 to control EAP Reauthorization Period
RADIUS Server Port: Please enter the port number to communicate with the RADIUS Server.
RADIUS Server Password: Please input the password of RADIUS authentication server here.
Cipher: Available options are: TKIP, AES and Auto. Please select one of them.
RSN Reauthorization: Choose Enable or Disable to control RSN Reauthorization. RSN (Robust Secure Network) is part of the 802.11i standard.
WPA Group Rekey Interval: Specify the interval in milliseconds.

6.2.3.4 WPA/WPA2-PSK Security



WPA Mode: Select to apply WPA2 security.
Enhanced Security for: Personal Shared Key
Preshared Key: Enter a Paraphrase which is an alphanumeric phrase password between 8 to 64 ASCII characters. That allows a wireless WPA client with the same security key to connect the AP.
Cipher: Available options are: TKIP, AES and Auto. Please select one of them.

6.2.3.5 WPA/WPA2-Enterprise (RADIUS) Security



WPA Mode: Select to apply WPA2 security.
Enhanced Security for: RADIUS
EAP Reauthorization Period: Please input 300~3600 to control EAP Reauthorization Period.
RADIUS Server Port: Enter the port number to communicate with the RADIUS Server.
RADIUS Server Password: Please input the password of RADIUS authentication server here.
Cipher: Available options are: TKIP, AES and Auto. Please select one of them.
RSN Reauthorization: Choose Enable or Disable to control RSN Reauthorization. RSN (Robust Secure Network) is part of the 802.11i standard.
WPA Group Rekey Interval: Specify the interval in milliseconds.

6.2.4 Site Survey

This page provides tool to scan the wireless network. The table will list the access point nearby as the access point is set to Station mode; you can select one of the access points to associate.

Site Survey (Channel Scanning)

BSSID	SSID	Radio Mode	Channel	Signal Strength	Security Mode
Cell01 00:15:61:10:56:84	LOOP_AP_TEST	AP	Frequency:2.412 GHz (Channel 1)	Signal level=-86 dBm Noise level=-95 dBm	off
Cell02 00:15:00:5C:2B:99	ACER-PC-62780	AP	Frequency:2.412 GHz (Channel 1)	Signal level=-91 dBm Noise level=-95 dBm	on

Scan

SSID: Displays the SSID name of the access point.
BSSID: Displays the BSSID (MAC Address) of the access point.
Radio Mode: Displays the Operation Mode of the device.
Channel: Displays the channel number of the access point.
Signal Strength: Displays the signal strength of each access point. The signal strength is stronger, the connection quality is better.

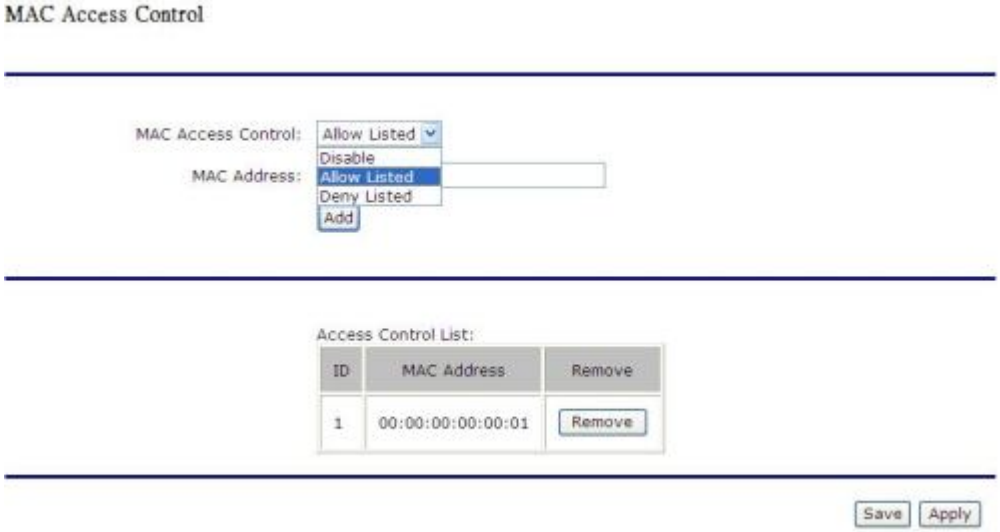
Signal Strength (dBm)	Description
>-25	Overload
-25~-35	Excessive
-35~-60	Excellent
-60~-75	Good
-75~-95	Weak
<-95	Poor

Table 6-2 Signal Strength

Security Mode: Displays the security mode of the access point if you have selected the security.

6.2.5 MAC Access Control

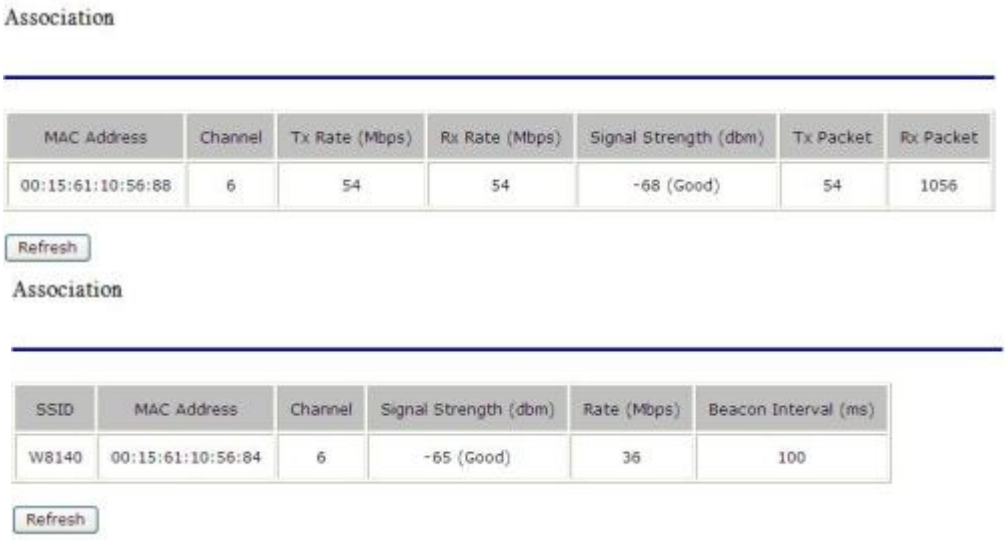
Another security measure you can use to keep hackers and intruders away is “MAC Access Control”. You can pre-define a list of the clients you trust. All other wireless client with the MAC address which is not in your list will be denied by this wireless access point.



MAC Access Control: Enable or Disable MAC address Control.
MAC Address: Enter the MAC address of the client you trust.

6.2.6 Association

This page presents an overview of the MAC address, Signal Strength (dBm) of all clients connected to the AP through Ethernet or wireless, SNR value in dB and Tx rate.

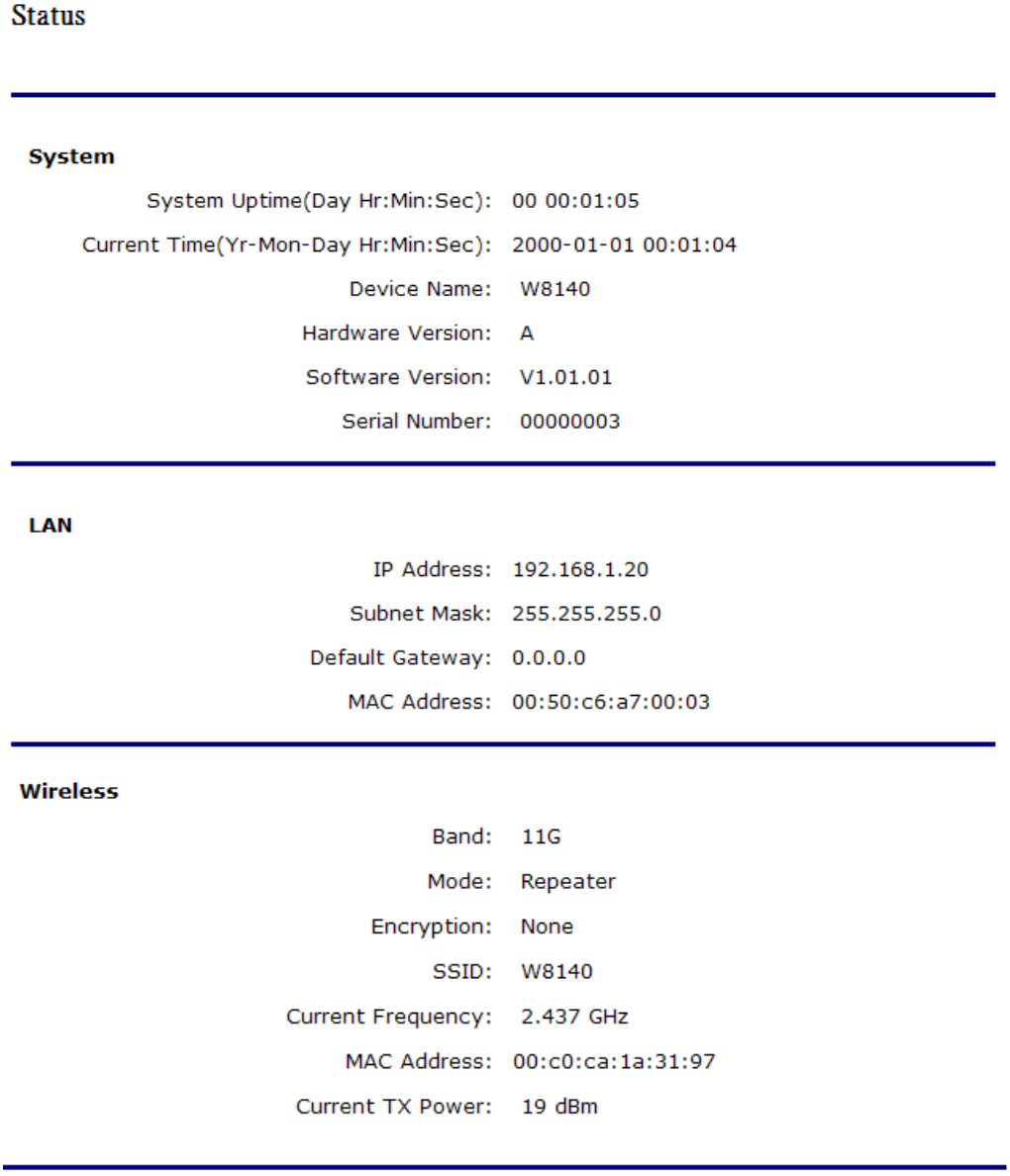


MAC Address, Channel, Tx Rate (Mbps), Rx Rate (Mbps), Signal Strength, Tx Packet and Rx Packet will be shown by clicking “Refresh” button

6.3 Management

6.3.1 Status

This page presents a convenient overview of the overall status of the AP. The most common configuration parameters are shown here, for a quick look.

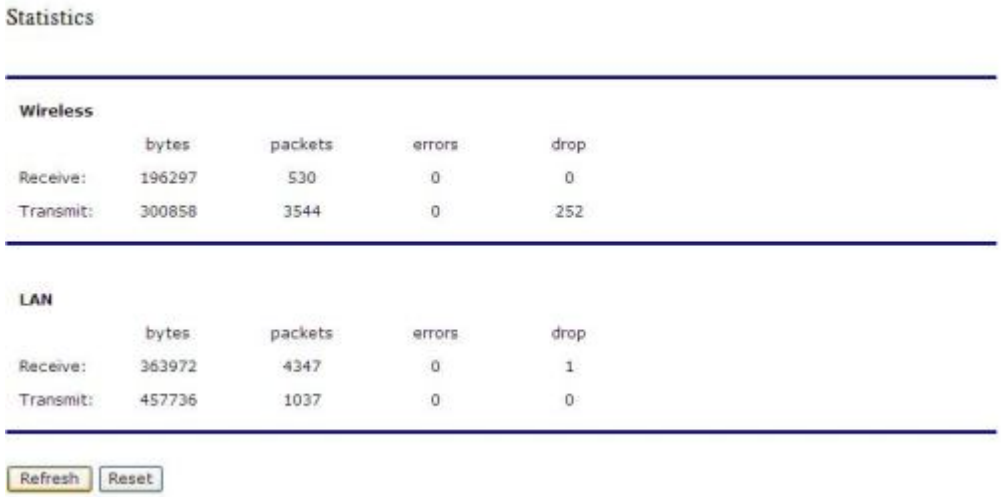


System Uptime: Displays the total passed time since the wireless access point is powered.
Current Time: Displays current time
Device Name: Displays the device name
Hardware Version: Displays the hardware version. This information is helpful when you need online help from the dealer of purchase.
Software Version: Displays the software version.
Serial Number: Displays the serial no. of this device.
IP Address: Displays the IP address of this wireless access point.
Subnet Mask: Displays the net mask of IP address.
Default Gateway: Displays the IP address of default gateway.
MAC Address: Displays the MAC address of LAN interface.

Band: Displays the wireless band.
Mode: Displays current wireless operating mode.
Encryption: Displays the encryption setting of the access point if you have selected the security.
SSID: Displays current SSID (the name used to identify this wireless access point).
Current Frequency: Displays the frequency.
MAC Address: Displays the MAC address of Wireless interface.
Current TX Power: Displays current TX Power.

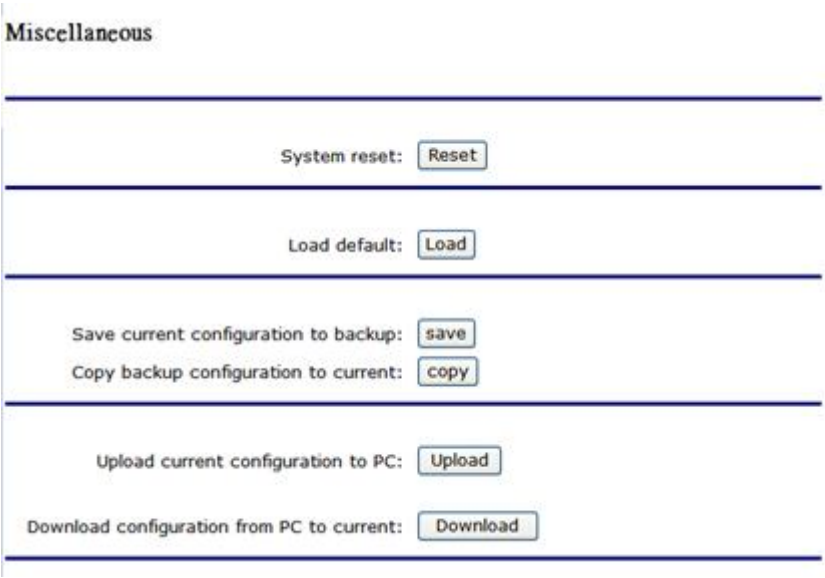
6.3.2 Statistics

This screen shows information on wireless and Ethernet connection.



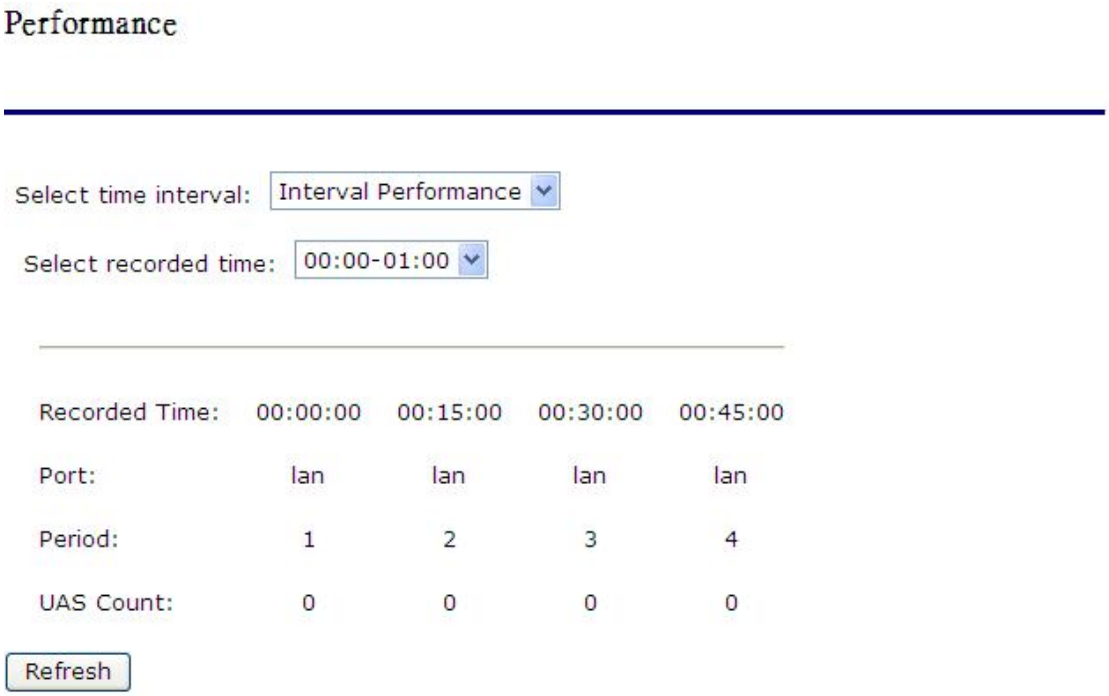
Wireless: This will show the recorded wireless statistics information.
LAN: This will show the recorded LAN statistics information.
Refresh: You can clear all the statistics information by clicking “Refresh” button.

6.3.3 Miscellaneous



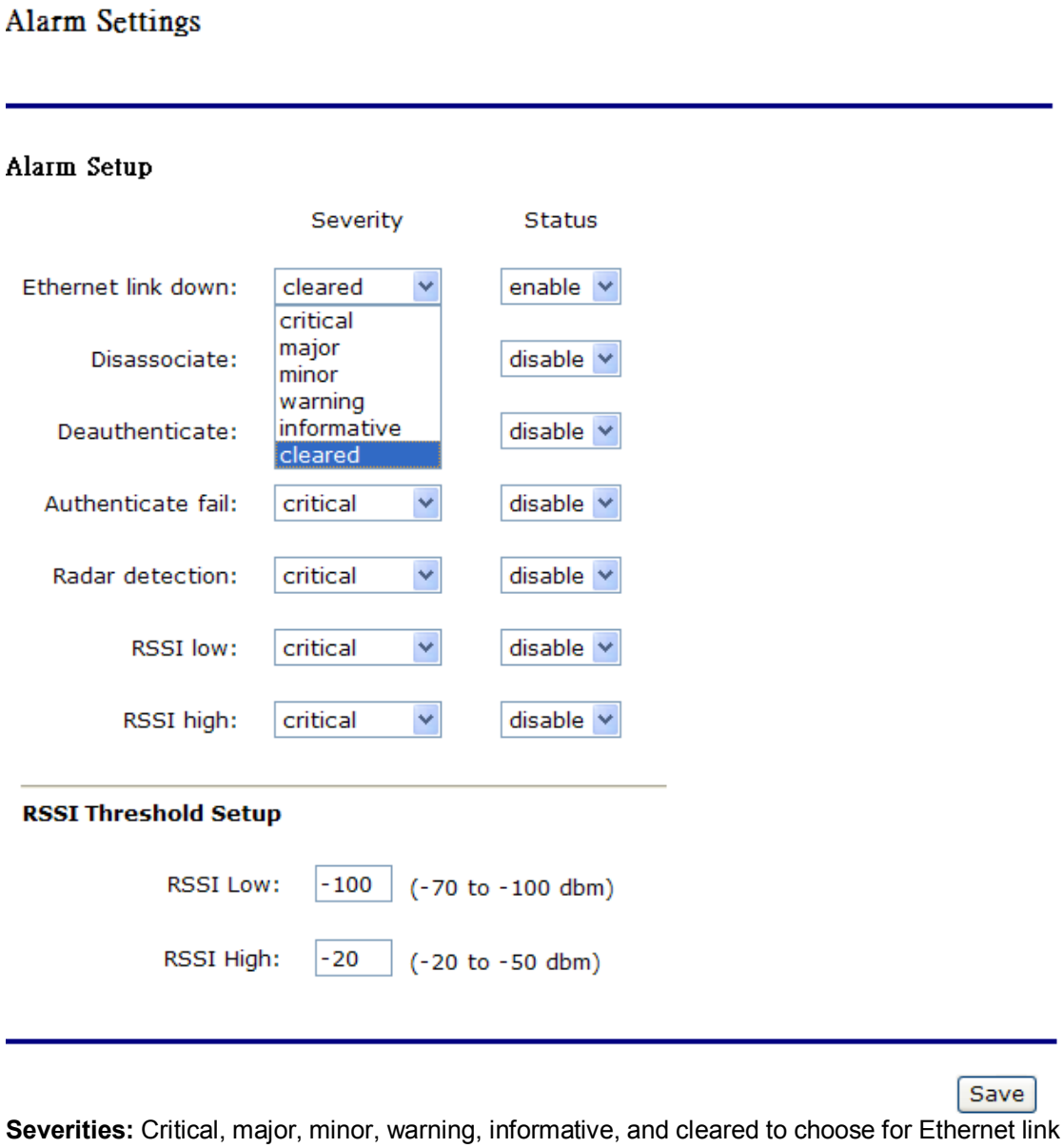
System reset: When you think the access point is not working properly, you can use this function to restart the access point; this may help and solve the problem. To reset your access point, please click “Reset” button.
Load default: Click this button to remove all settings you made, and restore the configuration of this access point back to default settings.
Save current configuration to backup: Press “save” button to backup the current configuration to the device.
Copy backup configuration to current: Press “copy” to restore a previously-saved configuration file from the device.
Upload current configuration to PC: Press “Upload” button to upload current configuration to PC.
Download configuration from PC to current: Press “Download” to download configuration from PC to current.

6.3.4 Performance



Select time interval: To select the time interval you would like to check for the performance. Choose from below: interval performance, 7days performance, or current performance.
Select recorded time: To select the recorded time period you would like to check.
UAS Count: UAS stands for Unavailable Second. It is use to calculate the number of unavailable seconds.

6.3.5 Alarm Settings



Severities: Critical, major, minor, warning, informative, and cleared to choose for Ethernet link down, Disassociate, Deauthenticate, Authenticate fail, Radar detection, RSSI low and RSSI high.
Status: To enable or disable the send trap function.

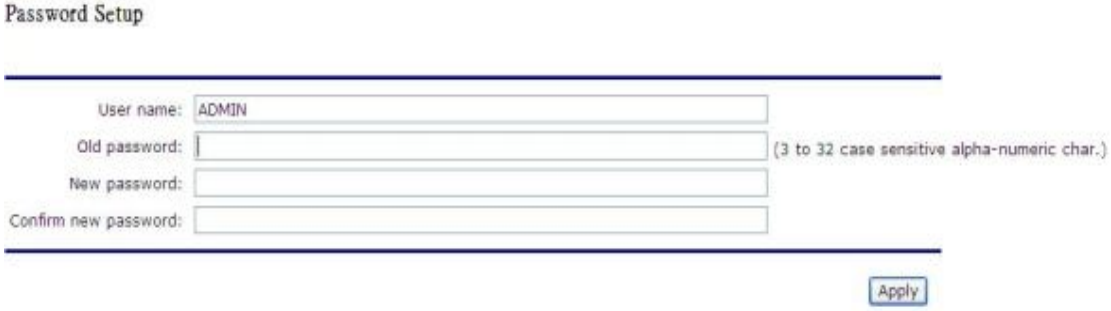
RSSI Threshold Setup:
RSSI Low: To setup the low RSSI of alarm. Default is -100.
RSSI High: To setup the high RSSI of alarm. Default is -20.

6.3.6 Time Settings

Current Time: Displays the current time.
SNTP Client: SNTP=Sample Network Time Protocol.
SNTP Server IP: Please set the SNTP server address where the GMT time will be retrieved.
Time Zone: Please set the time zone to know the local current time.
System Time Setup: User could set current time if SNTP Client function disabled.

6.3.7 Password Setup

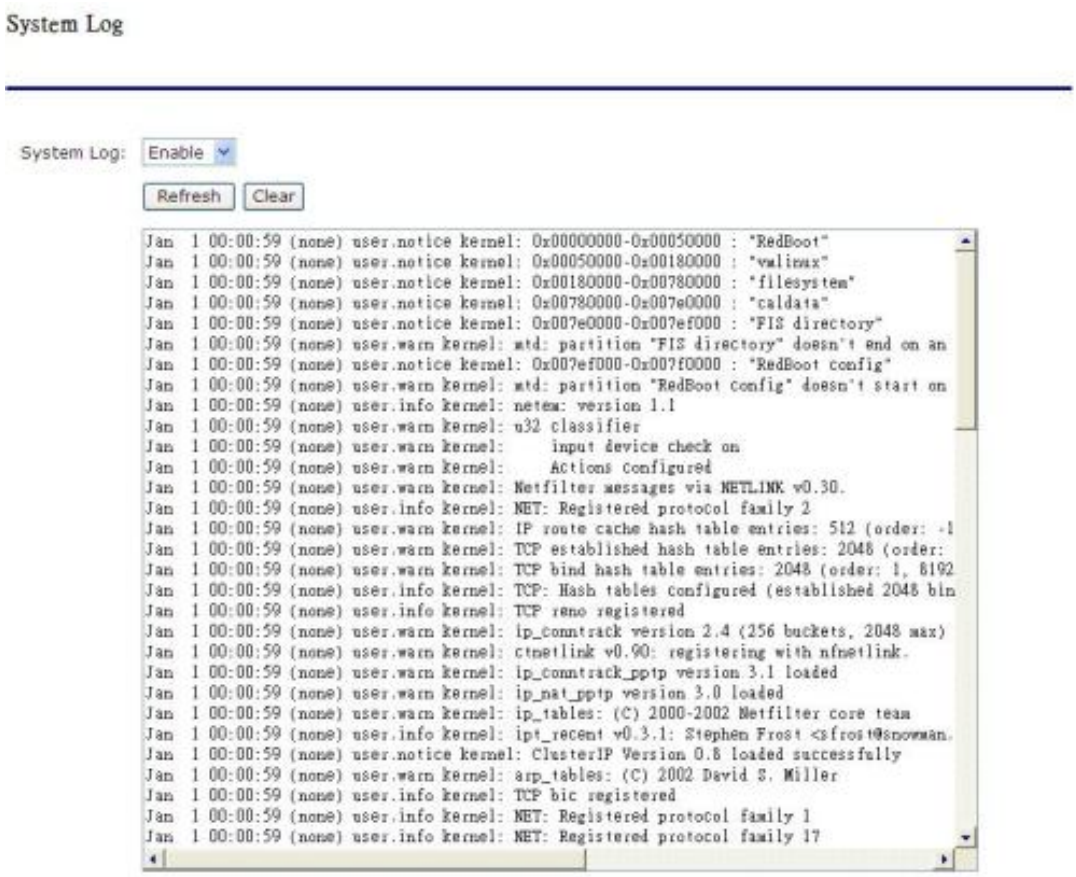
This page allows you to change the password for admin user/end user.



1. Input current password in “Old password” field.
2. Input new password in both “New password” and “Confirm new password” field.
3. Click “Apply” button.

Note: The user name and password you could modify depends on the authority of the logged-in account. The user names of ADMIN and OPERATOR cannot be the same.

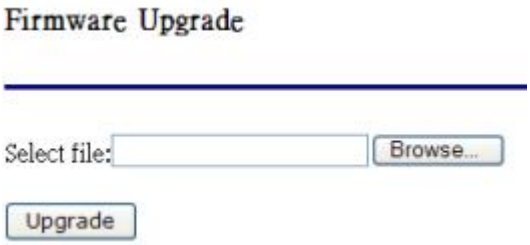
6.3.8 System Log


System Log
System Log: Enable
Refresh
Clear
Jan 1 00:00:59 (none) user.notice kernel: 0x00000000-0x00050000 : "RedBoot"
Jan 1 00:00:59 (none) user.notice kernel: 0x00050000-0x00180000 : "vmlinux"
Jan 1 00:00:59 (none) user.notice kernel: 0x00180000-0x00780000 : "filesystem"
Jan 1 00:00:59 (none) user.notice kernel: 0x00780000-0x007e0000 : "caldata"
Jan 1 00:00:59 (none) user.notice kernel: 0x007e0000-0x007ef000 : "FIS directory"
Jan 1 00:00:59 (none) user.warn kernel: mtd: partition "FIS directory" doesn't end on an
Jan 1 00:00:59 (none) user.notice kernel: 0x007ef000-0x007f0000 : "RedBoot config"
Jan 1 00:00:59 (none) user.warn kernel: mtd: partition "RedBoot config" doesn't start on
Jan 1 00:00:59 (none) user.info kernel: netem: version 1.1
Jan 1 00:00:59 (none) user.warn kernel: u32 classifier
Jan 1 00:00:59 (none) user.warn kernel: input device check on
Jan 1 00:00:59 (none) user.warn kernel: Actions configured
Jan 1 00:00:59 (none) user.warn kernel: Netfilter messages via NETLINK v0.30.
Jan 1 00:00:59 (none) user.info kernel: NET: Registered protocol family 2
Jan 1 00:00:59 (none) user.warn kernel: IP route cache hash table entries: 512 (order: -1
Jan 1 00:00:59 (none) user.warn kernel: TCP established hash table entries: 2048 (order:
Jan 1 00:00:59 (none) user.warn kernel: TCP bind hash table entries: 2048 (order: 1, 8192
Jan 1 00:00:59 (none) user.info kernel: TCP: Hash tables configured (established 2048 bin
Jan 1 00:00:59 (none) user.info kernel: TCP reno registered
Jan 1 00:00:59 (none) user.warn kernel: ip_conntrack version 2.4 (256 buckets, 2048 max)
Jan 1 00:00:59 (none) user.warn kernel: ctnetlink v0.90: registering with nfnetlink.
Jan 1 00:00:59 (none) user.warn kernel: ip_conntrack_pptp version 3.1 loaded
Jan 1 00:00:59 (none) user.warn kernel: ip_nat_pptp version 3.0 loaded
Jan 1 00:00:59 (none) user.warn kernel: ip_tables: (C) 2000-2002 Netfilter core team
Jan 1 00:00:59 (none) user.info kernel: ipt_recent v0.3.1: Stephen Frost <sfrost@snowman.
Jan 1 00:00:59 (none) user.notice kernel: ClusterIP Version 0.8 loaded successfully
Jan 1 00:00:59 (none) user.warn kernel: arp_tables: (C) 2002 David S. Miller
Jan 1 00:00:59 (none) user.info kernel: TCP bic registered
Jan 1 00:00:59 (none) user.info kernel: NET: Registered protocol family 1
Jan 1 00:00:59 (none) user.info kernel: NET: Registered protocol family 17

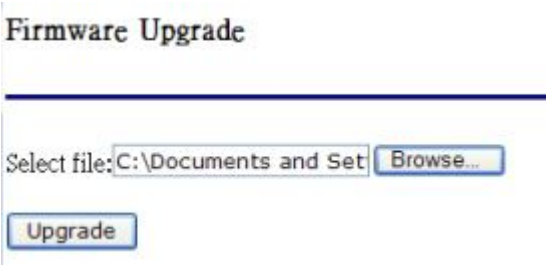
System Log: This will enable all log records to be saved into another server for future reference.

6.3.9 Firmware Upgrade (for User ADMIN only)

This page allows you to upgrade the firmware (software) in the AP. If there are new firmware of this wireless access point available, you can upload the firmware to the access point to change the firmware with a new one, to get extra functions or problem fix.



Step 1. Browse to the file of new firmware.



Step 2. Click on **Upgrade**.

Step 3. File upload success, click on **Apply** to continue or **Go back** to cancel upgrade.
Step 4. Please wait for a few minutes for firmware upgrade.

Waring: Upgrading firmware may take a few minutes.
Please do not power off the device or press reset button during upgrading procedure.
Please wait... 124
Click here when system is ready

Firmware upgrade done.

7 Troubleshooting

Scenario	Access point is not responding to me when I want to access it by browser.
Solution	**a.** Please check the connection of power cord and network cable of this access point. All cord and cable of this should be correctly and firmly inserted to the access point.
	b. You should use the same IP address section which access point uses.
	c. If you did a firmware upgrade and this happens, contact your dealer of purchase for help.
	d. If all above solution doesn't work, contact the dealer of purchase for help.
Scenario	Cannot get connected to wireless access point.
Solution	**a.** If encryption is enabled, please re-check WEP or WPA passphrase settings on your wireless client.
	b. Try to move closer to this access point.
	c. Unplug the power plug of access point, and plug it back again after 10 seconds.
Scenario	File download is very slow or breaks frequently.
Solution	**a.** Reset the access point to see if it is better.
	b. If someone is transferring huge files on your local network, you will think the file download is slow.
Scenario	Cannot log onto web management interface: password is wrong.
Solution	**a.** Make sure you are connecting to the correct IP address of the access point.
	b. Password is case-sensitive. Make sure the "Cape Lock" light is not illuminated.
Scenario	Access point is hot.
Solution	**a.** It is not a malfunction if you can keep your hand on the access point's case.
	b. If you smell something wrong or see the smoke coming out from access point or power adapter, please disconnect the access point and power adapter from utility power, and call your dealer of purchase for help.

8 GLOSSARY

802.1x	An IEEE Standard for port-based Network Access Control
AES	Advanced Encryption Standard
AP	Access Point
BSSID	Basic Service Set Identifier
DHCP	Dynamic Host Configuration Protocol
DTIM	Delivery Traffic Indication Message
EAP	Extensible Authentication Protocol
GI	Guard Interval
IP	Internet Protocol
IPX	Internet Packet eXchange
LAN	Local Area Network
MAC address	Media Access Control address
MIMO	Multiple-Input and Multiple-Output
PoE	Power over Ethernet
PPPoE	Point-to-Point Protocol over Ethernet
QoS	Quality of Service
RADIUS	Remote Authentication Dial In User Service
RSN	Robust Security Network
SNMP	Simple Network Management Protocol
SSID	Service Set Identifier
TCP	Transmission Control Protocol
TKIP	Temporal Key Integrity Protocol
UAS	Unavailable Second
VLAN	Virtual Local Area Network
WLAN	Wireless LAN
WEP	Wired Equivalent Privacy
WPA	Wi-Fi Protected Access
WPA-PSK	WPA Pre-shared Key

9 DISCLAIMER

- Manufacturer assumes no responsibility for any damage or loss resulting from the use of this manual.
- Manufacturer assumes no responsibility for any loss or claims by third parties that may arise through the use of this product.
- Manufacturer assumes no responsibility for any damage or loss caused by incorrect use of the AP.
- The contents of this manual are subject to change without prior notice due to engineering improvement.
- No part of this manual may be reproduced in any form without the express written consent of the Manufacturer.
- Sample displays shown in this manual may differ somewhat from the displays actually produced by the product.
- User manual may differ for different firmware version.
- All brands and product names are trademarks or registered trademarks of their respective holders.